MODEL AIRPLANE NEWS

11th Year of Publication

FEBRUARY, 1940

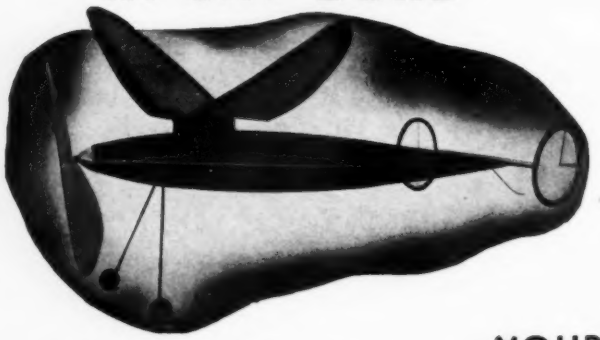
20c

The Republic XP-40 Pursuit

SPECIALS!

30" FLYER

the **SKY BURD**



12" SOLID

HOWARD HUGHES **LOCKHEED "14"**

which flew around the world!

YOUR CHOICE

10¢

YOUR CHOICE

NO SKIMPING!

Shrewd engineering! Colossal production! Sensational performance! The three "BURD" qualities known universally by model builders shopping for the best. The "Sky Burd" is no ordinary model in size, value or flying ability. See it at your dealers!

COMPLETE!

"BURD" introducing these new numbers sets new standards of value, based on what you, the model builder, would like to get. It's revolutionary, but "BURD" makes you the winner. Smashing values! Never equaled! Produced by "BURD"!

CONTENTS

- 1 Full size 16" x 32" plan
- 1 Full size 20" x 24" sheet silk tissue
- 1 Printed balsa sheet 1/16" x 3" x 10"
- 2 3/32" x 3/16" x 13" strip balsa
- 20 3/32" x 3/32" x 13" strip balsa
- 3 3/32" x 1/16" x 13" strip balsa
- 1 1/16" x ¼" x 6" bamboo
- 2 hardwood wheels 1" diameter
- 1 length .020 steel wire
- 1 tube cement
- 1 balsa block ¾" x 1" x 1"
- 1 Lawrence true-pitch 7¾" balsa finished propeller

A word with MR. DEALER:

Christmas has just passed. The festive season is gone. Gone, also is the sales volume connected with this occasion. That is, it was gone! Now, with these special items, "BURD" makes it possible to start off the model building season weeks earlier than usual. Don't be a laggard. Get in on the early rush for these sensational items. Don't let the other fellow get the model business. Give the customer what he wants. THESE MODELS ARE ALREADY IN STOCK FOR IMMEDIATE DELIVERY! Don't Delay!

CONTENTS

- 1 Printed balsa body block 1" x 1½" x 8"
- 2 Completely finished cowls and nacelles
- 1 Printed balsa wing sheet ¼" x 3" x 7¼"
- 1 Tube cement
- 1 Printed balsa sheet 1/16" x 2" x 4¾"
- 2 Hardwood wheels ½" diameter
- 2 Finished metal propellers
- 1 Printed insignia sheet
- 1 Full size plan

ON SALE BY DEALERS EVERYWHERE!

WE POSITIVELY WILL NOT SHIP DIRECT! GET THESE SENSATIONAL VALUES AT YOUR DEALER'S!

BURD MODEL AIRPLANE COMPAN

2113-2117 EAST OLIVER STREET **BALTIMORE, MARYL**

buy SUPER-CYCLONE "G" SERIES

OR BABY CYCLONE "F" SERIES

NO OTHER ENGINE CAN MATCH THIS LIST OF SUPER-CYCLONE FEATURES!

1. Most thoroughly designed and finest appearing engine on the market.
2. Rotary crank shaft admission valve.
3. One piece crank shaft, crank pin and counterweight integral, machined all over.
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5. Plunger lock on ignition timer.
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7. Twin spark — easy starting made easier.
8. Heavy duty ball bearing thrust with hardened steel races.
9. Hardened steel cam with non-slip prop drive.
10. Transparent fuel tank with large approved snap cover filler.
11. Suction gas feed, either upright or inverted.
12. 7/16" diameter main bearing of finest bearing metal obtainable.
13. Finest aluminum die castings the world affords.
14. Super light weight lapped in piston of special construction.
15. Positive ratchet lock on needle valve.
16. Correctly designed and proportioned flywheel with integral slotted drive, washer and nut included—$1.25 each.
17. H sectioned aluminum alloy con rod with oversized bronze bearing inserts, bushed both ends.
18. Tubular hardened and ground full floating wrist pin.
19. Crank case has fins for air-cooling and appearance.
20. Removable exhaust stack.
21. No leaky clamp-on or screwed-on port covers.
22. Serviceable aircraft steel engine mounts for fire wall installation.
23. Screws and parts cadmium and nickel plated.
24. Six conversions to choose from.
25. Either dual or single ignition.
26. Upright models can be changed to inverted, or vice versa, without additional parts.
27. Cylinder may be turned 180 degrees for either right or left exhaust.
28. Needle valve seat may be changed to either side.
29. Timer assembly 180 degrees reversible—easy to get at spark lever.
30. Comes all mounted and wired ready to install.
31. Manufactured by an old established aircraft concern.
32. SUPER-CYCLONE will fly any kit now on the market—WITH POWER TO SPARE—yet light enough for small jobs.

COMPLETE AND READY TO INSTALL! — There are no extras to buy, every SUPER-CYCLONE engine is delivered complete and assembled with spark coil, condenser, transparent fuel tank and engine mounts. Type: two stroke cycle. Two port rotary admission valve. Transfer integral with cylinder. 1/5 to 1/4 horsepower. Bore 15/16", stroke 15/16". Displacement .647 cu. in. Weight bare, approximately 7 oz. Every engine thoroughly tested and given full throttle run. Sixty day guarantee against defective materials or workmanship.

BUY DIRECT — We have no dealers in the United States. The low price of this sensational new engine is the result of buying direct from the manufacturers, whose production methods and tremendous volume of sales permit them to offer you this great value.

SUPER-CYCLONE DUAL IGNITION— A special coil fires both plugs simultaneously. In the event one should foul or a spark lead should become disconnected, engine continues to run on the other plug.

USE THIS HANDY ORDER BLANK TODAY!

Our successful experience in the building of the preceding models of Baby Cyclone has enabled us to produce in the SUPER-CYCLONE the finest example of miniature engine engineering ever placed on the market at any price! It is an entirely new engine, with more sensational features and precision construction than any other engine, yet every improvement is based on a thorough knowledge of the problems involved. MORE HORSEPOWER—Using exactly the same propeller with all engines, SUPER-CYCLONE was tested against four of the most popular and well-known engines in the 1/5 Horsepower Class—SUPER-CYCLONE turned up over 1000 R.P.M. more than any other engine!

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GRAND CENTRAL AIR TERMINAL, GLENDALE (Los Angeles) CALIF.

Please send me items checked. I enclose POST OFFICE MONEY ORDER.

Super-Cyclone

With coil, condenser, fuel tank and engine mounts — $15.00

- ☐ Upright—Single Ignition $13.00
- ☐ Upright—Dual Ignition ——→
- ☐ Inverted—Single Ignition $13.50
- ☐ Upright—Dual Ignition $15.50
- ☐ Single Ignition with Flywheel (less mounts) $14.00
- ☐ Dual Ignition with Flywheel (less mounts) $16.00

Baby Cyclone

☐ America's most popular engine for sport flying. Price will advance shortly to $12.50. ——→ $9.00

- ☐ Flywheel, with washer and nut $1.25
- ☐ Steel Mounting Brackets ..... 50¢

PROPELLERS—the finest quality obtainable. $1.00. ☐ 14" ☐ 13" ☐ 12"

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Model AIRPLANE News

11th YEAR OF PUBLICATION

VOL. XXII *No. 2*

Edited by Charles Hampson Grant

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Published Monthly by JAY PUBLISHING CORP., Mount Morris, Illinois.
Editorial and General Offices, 551 Fifth Avenue, New York City.
Jay P. Cleveland, President. N. Howard Williamson, Secretary.
Jay P. Cleveland, Advertising Manager, 551 Fifth Avenue, New York, N. Y.
Entered as second-class matter Dec. 6, 1934, at the post office at Mount Morris, Ill., under the act of March 3, 1879. Additional entry at New York, N. Y.
Copyright 1939 by JAY PUBLISHING CORP.
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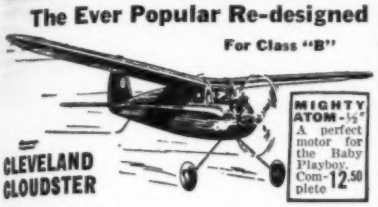
CHOOSE "CLEVELAND'S" CONSISTENT COUNTRYWIDE "CONTEST-COPPERS"

(TRY'N SAY IT FAST 5 TIMES)

The Ever Popular Re-designed CLEVELAND CLOUDSTER

For Class "B"



MIGHTY ATOM-½" A perfect motor for the Baby Playboy. Complete 12.50

A 50"—complete 22 oz. gas model complete with full size drawing, printed ribs, shaped leading edge, cut strip wood, colored covering paper, wood and paper cements, balsa wheels, formed landing gear, etc. Ohlsson "23" recommended for this model complete Kit (except power unit) GP-5004. Only..... **$2.50**

"CHAMPION" FLEETSTER, PLAYBOY, CLOUDSTER KITS CONTAIN

• Full size well detailed drawing • Simple leading edge • Printed out ribs and parts • Plywood for fire wall • Cut to size wood strips • Colored tissue • Wood and tissue cements • Formed wire landing gear • Streamlined wheels • Celluloid, nuts, bolts and everything else needed except power unit.

Cleveland Unusual Model Hit FLEETSTER

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Sister ship of our popular Cloudster. This model has beautiful lines. Special wing design, together with highly streamlined fuselage and lifting tail, makes this an excellent contest model. Yellow and blue trimmings. No lighter or prettier cabin type gas model ever developed. Span 42½", weight 18½ oz. Complete kit GP-5007 (except power unit). Only **$2.50**

SENSATIONAL!

World's First $1.00 Gas Model

Class A "Baby Playboy" $1.00

33"—8 oz. 144 sq. in. model designed especially for small motors like the Atom, etc. Flies rubber powered too!

Easy As A Wakefield Model to Build

C-D "PLAYBOY"

Playboy Junior

(Complete except power unit). A perfect "step-up" design to serious gas model work, yet one which will give a better-than-average chance of winning contests for both beginners and "old timers" alike. A "wow" for flights. Color, yellow and black. Span 46"—18½ oz. Complete Kit GP-5006 including everything necessary (except power unit) only..... **$2.50**

Dick Korda's Class "B" "CHAMPION"

This flying masterpiece (exclusive with Cleveland) was designed, tested and contest-proved by Dick Korda, America's No. 1 model airplane builder. Winner in many contests, including the Detroit Nationals. Span 48"—23 oz. complete, but may be lightened to 20-21 oz. Beautiful red trimmed, yellow (or gray) flyer. Wing fitted with slip-off cradle in event of crash. Complete Kit GP-5005 includes everything necessary (except power unit) only..... **$2.95**

C-D Stinson Reliant GP-66

Most Popular Radio-Control Scale Model

82" Gas model kit for ¾" bore or larger engines with full size plans, printed wood, cut strip wood, shaped leading edge, turned fuselage and cowl front, covering tissue, celluloid, heavy wire, screws, etc., now contains shoes, pneumatic wheels, tissue and wood cement. Complete..... **$10.95**

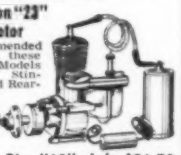
Power Unit Extra

C-D REARWIN SPEEDSTER

64½" gas model kit, for ¾" or motors, contents same as Stinson. Complete..... **$7.50**

Power Unit Extra

Ohlsson "23" Motor



Recommended for all these Gas Models except Stinson and Rearwin.

$16.50

New Big "60" Job $21.50

Popular Brown Junior

Excellent ⅞" bore motor for any big job like Rearwin or Stinson. Only

Model "D" $12.50
Model "C" $18.50
Model "B" $21.50

Build These U. S. War Planes

SEVERSKY P-35 FIGHTER

Complete Kit SF-61 (Span 24") $2.25
Complete Dry Kit D-61 (Span 16") 85c

CONTEST WINNING CURTISS F11C-2

Complete Kit SF-49 (Span 23⅝") $2.50
Complete Dry Kit D-49 (Span 15¾") 85c

Turner's '38-'39 T., T. Winner

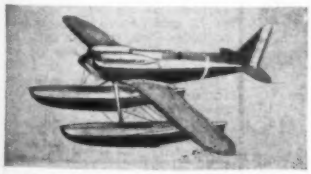
From this Kit you may build either the 1938 or 1939 winner—only difference being in trademark on the fuselage side (1938) was Pesco Special, 1939 Miss Champion. Choice of 2 Kits: Dry Dwarf, (12⅛") 50c; SF (18¾") absolutely complete **$1.75**

Now Fighting for England Over the Western Front

(We have 11 others too, at 25c and 50c)

REP-20" Phantom Fairy "Battle" REP-67 25c

REP-30 25c 20" Hawker "Hurricane" Fighter



The Ever Popular Supermarine S.6.B

Complete Kit SF-19 (Span 22") $1.75
Complete Kit D-19 (Span 14⅛") ..... .65

GAS POWERED RACE CAR KITS

20" Speed Demon, friction drive, all metal parts finished..... $16.50
"Rocket" front wheel steering, front wheel drive 19.00
Mercury Midget, all cast aluminum rear wheel drive..... 23.50
Alexander C.A.R., all cast aluminum, easy to assemble, front wheel drive... 25.00

ALL ABOVE KITS WITHOUT MOTOR

Complete Speedway Motor..... $14.00
Dennymite Motor 17.85

NEW C-D CATALOG JUST OUT!

Just off the press! Contains 3 great lines of C-D airplanes, also 25c airplanes for beginners and larger ready-to-fly models. Also model railroad equipment and toy trains, 10c up in C-D and HO gage; a wide variety of gas model airplanes and all well-known makes of gas engines; gas and "rubber driven" supplies; also "general" supplies for railroad and innumerable model uses; race cars, hand tools, and a wide variety of ship kits and fittings. Nearly everything a real model builder could wish for within its pages for only one thin dime. Send for it today! (NO FREE COPIES.)

Only 10c

KIT D-55 $2.50

42⅜" DOUGLAS TRANSPORT

A Beautiful Kit, Complete with Liquids

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REAL ENGINE VALUE—$4.95

Here is your opportunity to buy a kit of the famous G.H.Q. Gasoline Motor. ABSOLUTELY COMPLETE—ALL MACHINING DONE—READY TO ASSEMBLE. All you need is a screwdriver. No mechanical knowledge required. BUILD YOUR OWN ENGINE AND SAVE!!

AN ENGINEERING TRIUMPH . . .
Never Before at So Low a Price!!

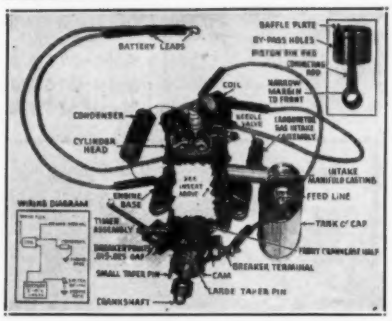
Indeed an engineering triumph—accomplished by outstanding G.H.Q. designers and engineers, who have constructed into the G.H.Q. motor everything that years of exhaustive scientific aerodynamic research could produce—geared to the highest possible degree of perfection. But more than that, the acid test . . . an overwhelming response. Thousands of users in all parts of the country are praising, recommending, and endorsing this scientific achievement. It seems as if everyone in America wants one. The most hair-raising thrill you've ever experienced will be yours with the G.H.Q. motor—actually one of the most powerful motors ever constructed. Has broken records for amazing performance . . . and just imagine—flies model planes up to 10 foot wingspread. AND JUST AS EFFICIENT FOR BOATS, MIDGET CARS AND STATIONARY USE. Easy to start and simple as ABC to assemble.

Everything is in the kit including Champion spark plug, coil, condenser, tank and cap, ignition wire, cylinder, piston, connecting rod, timer, crankshaft, all screws, nuts, bolts, complete instructions, etc. Every part is fully machined and finished. No oil, gas, batteries, or propeller included. A SCREWDRIVER IS THE ONLY TOOL YOU NEED.

EXACTLY THE SAME PARTS THAT GO INTO THE G.H.Q. ASSEMBLED ENGINE

ALL PARTS GUARANTEED

Average Assembly Time 30 Minutes



THE ONLY ENGINE WITH A WARRANTY—APPLIES TO BOTH ASSEMBLED ENGINES AND KITS

Over 7000 of these same famous G.H.Q. Gasoline Engines have been sold at $8.50. Mass production methods and enthusiastic reception have enabled us to reduce the price from $35 originally TO THE NEW LOW PRICE OF $4.95.

The new 1940 model now for sale includes the new unbreakable steel stamped piston giving high and perfect compression, drop forged one-piece crankshaft, self oiling "Ledaloyl" bronze bearing, etc.

SPECIFICATIONS

4 Port 2 Stroke Cycle. ¾" Stroke. 15/16" Bore. 300-7,000 R.P.M. Turns 14" Prop. 8" Pitch. Bearing Surface, 1¼" Long. Crankshaft, 5/16" Diam. Weight, 10 oz. (Motor) Rotation, Either Direction. Height, 4½"—Width, 2½", H.P. Approx. 1/5th.

G. H. Q.'s SIXTH YEAR!

Thousands of Satisfied Users! Read some of these testimonials on file with us:

J. B., Providence, R.I.—"A few weeks ago I received the G.H.Q. motor kit and it is running perfectly. I hope to write you soon and tell you about some excellent flights."

R. H., Prairie du Chien, Wis.—"Your motors sure can take a lot of abuse and knocking around and yet perform perfectly. I have had two in a period of about two years and have seen higher priced motors give less service and performance."

W. W. M., Russellville, Ark.—"I received my G.H.Q. Motor Kit and am very well pleased. I had motor together in 1 hr. 40 min. I will place order next week for G.H.Q. Sportster Kit."

W. L., Claysburg, Penn.—"A wonderful motor that thrills any air-minded person. Strong and neat looking. As good as motors costing twice as much."

A. K., Hillside, N.J.—"I still can't understand how you can put such a dependable and rugged engine on the market at such a low price."

E. T., Sayville, N.Y.—"Received my G.H.Q. Kit okay and am more than delighted with same. You've got 'em all beat for price and performance."

R. P., Hamburg, N.Y.—"I want to extend my personal thanks to G.H.Q. for their prompt service. The motor I ordered was received within 24 hours. Such service cannot be surpassed. I also want to say that I have the motor running perfectly. I shall do all I can to help promote the success of G.H.Q."

H. H., Midlothian, Ill.—"Motor assembled correctly and performs perfectly. I am fully satisfied."

L. N., So. Euclid, Ohio—"Received my finished motor. I am very pleased with it and runs fine. I will be glad to encourage others to get G.H.Q. motors."

C. C., Chicago, Ill.—"I received my motor and I am quite satisfied and surprised at the precision parts for the money."

E. E. F., Mare Island Navy Yd. Calif.—"I saw your offer of a complete G.H.Q. Gas Engine Kit for only $5 in the August issue of Mechanix Illustrated. I have just cracked up the G.H.Q. that I bought this spring. It had over 50 hours on it, and I have had very little trouble with it, and made my own repairs whenever the engine needed them. As I was glancing thru the magazine, the ad struck my eye. At that price I will be able to pursue my favorite hobby again, gas power models."

THE G. H. Q. GAS ENGINE CAN BE USED IN BOATS, MIDGET CARS & PLANES WITHOUT ANY CHANGES

The G.H.Q. Gas Engine sold four years ago for $35. Today, you can secure a vastly improved engine kit for only $4.95. How is this possible? Simply because we have invested thousands of dollars in tools, jigs, dies and equipment to produce the only mass-production motor in the market. All parts are uniformly perfect.

1939 SALES OF G. H. Q. ENGINES AND KITS TOTALED 15,000

DEALERS!

The G.H.Q. MOTOR KIT and the new low-priced

ROBOTAIRE

are sweeping the country. Get your share of this business!!

Our new discount schedule gives larger dealer discounts than ever before!

Write in Today!

WHY HANDLE G.H.Q.?
1. Little investment needed.
2. Attractive discounts.
3. Nation-wide advertising.
4. Free circulars for imprint.
5. Free display cards.
6. Full manufacturers co-operation.

From Among Our Many Dealers' Enthusiastic Letters:

SCRANTON HOBBY CENTER, 525½ Linden Street, Scranton, Pa.:
"I would like to say that I am very much satisfied with the results my customers have had in assembly and running of your motor kits. I have sold to date all but one of the engines which we have purchased from you, and they are all running successfully."

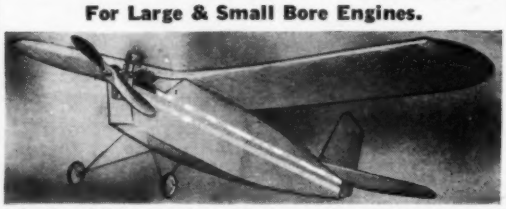
MODEL BUILDERS GUILD, 81 Lawrence Street, Hartford, Conn.:
"Your engine here in the city is popular with the boys and we expect to sell them very fast this summer; that's why we have started to buy them by the dozen."

★★★★★★★★★★★★★★★★★★★★★★
★ Visit us at our new, enlarged factory and showroom at 40 East 21st Street. Complete line of hobby-craft on display. ★
★★★★★★★★★★★★★★★★★★★★★★

THE ROBOTAIRE

A new trim, streamline gas modelplane. ***5 foot wingspan.***

For Large & Small Bore Engines.



Small and light enough to take any engine in the market, and rugged enough to take engines up to 1/3 horse-power, the **ROBOTAIRE** was especially designed for the G.H.Q. Engine on which it has been flight-tested for over 100 hours in the experimental model. Construction has been planned so that even a beginner can build the **ROBOTAIRE** easily and quickly. Plans and instructions are detailed and simple.

Kit is absolutely complete including plans, bamboo paper, wood, wheels, metal motor mount, cement, dope, etc.

Order your **ROBOTAIRE** today and enjoy the thrill of flying a 1940 designed gas job.

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A modern conception of a rocket plane. Elimination of the tail simplifies the motor design

IS THE ROCKET PLANE NEXT?

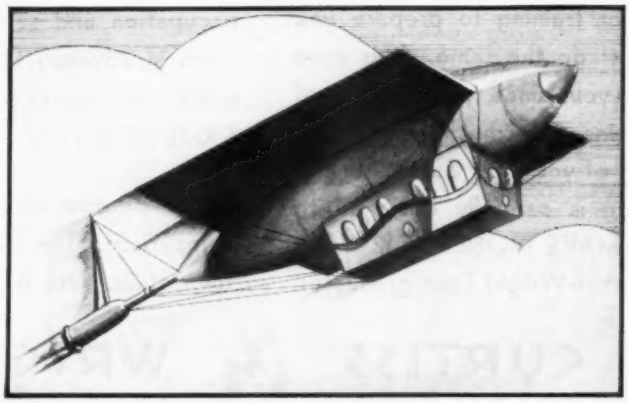
Through the Persistent Struggle of Farsighted Pioneers the Fantastic Dream of Rocket Propulsion Is Finally Becoming a Reality

By NICK LIMBER

WITH the attainment of greater speeds and higher altitudes, it has become evident that aircraft must undergo drastic changes in their method of propulsion, if aviation progress is to continue unrestricted by Dame Nature's capricious patterns.

Experimental flights into the rarified stratas have pointed to the inefficiency of propeller mechanism and internal combustion engines. Unless some new form of propulsion is devised, further aeronautical development will be limited . . . flights into the Stratosphere well nigh impossible.

What are engineers to do when this point is reached? Will they sit back and despondently admit they are defeated by Mother Nature or will they attempt to outwit Sister Stratosphere as they did many years ago Old Man Gravity?



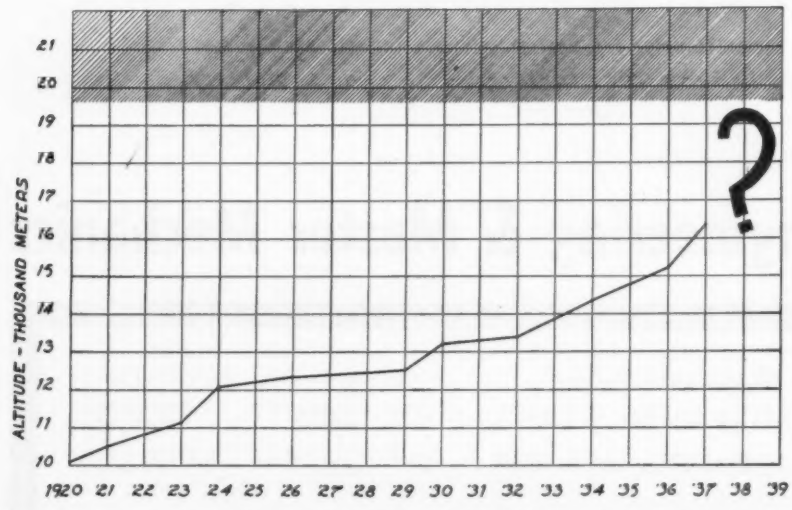
A 17th century conception of a rocket plane

As might well be guessed, science has already discovered a new method of propulsion and men are at work this very instant experimenting with motors that are expected to overcome the perplexing problems of flight in the stratosphere . . . and yes . . . eventually even the regions beyond.

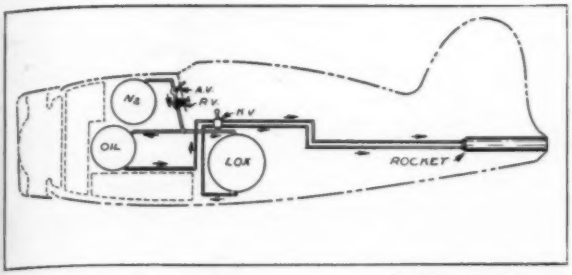
Experiments have shown that conquest of the stratosphere will depend upon the development of a propulsion mechanism capable of operation irrelevant of the medium through which it is projected. With this realization has come the belief that only the rocket motor can so operate to efficiently overcome the formidable obstacles of high speed flight in the rarified regions. Scientific investigations, conducted over a period of many years, point conclusively to this fact.

Laboratory tests have indicated marked efficiency increases in all rocket type motors operated under conditions simulating flight in the upper stratas and technicians have proven beyond all doubt that the "rocket-ship," that all important vehicle of science-fiction writers, will soon become an indispensable unit of the aeronautical science. It seems as though Col. Charles A. Lindbergh's prophecy of a few years ago will become a reality even sooner than anticipated.

Although rockets are not a recent



Time-Altitude Graph showing altitude record to date. Shaded portion indicates strata into which internal combustion engines on modern aircraft cannot penetrate. What are engineers to do when this limit has been reached?



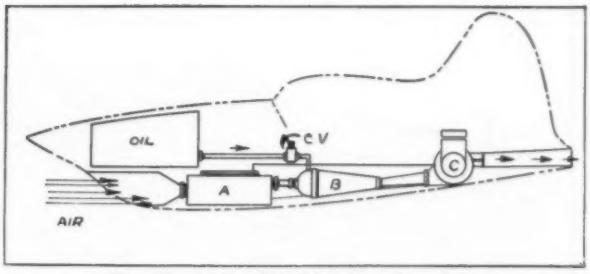
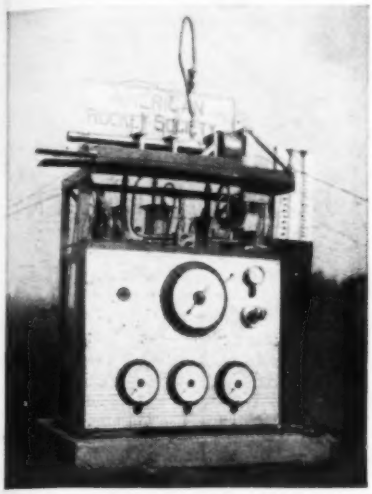


Fig. No. 1. Frank Whittle's rocket plane



The rocket motor test-stand of the American Rocket Society

Fig. No. 2. A pursuit plane with auxiliary rocket motors which cuts take off run 50 per cent and adds very little weight

invention, and were considered for aircraft use as early as 1860, much experimental research has been expanded within recent years in order that the device become adaptable to aircraft requirements. With the inevitable developments which have attended exhaustive experimental efforts, the rocket motor has lent itself to an increased measure of control. Beginning as the uncertain "brainchild" of theorists, it is today acclaimed as a potential engine of propulsion no less dependable than the internal combustion engine it is expected to replace.

According to records, the first attempt to link rocketry to aviation was made in 1860 when an American engineer named Betty conceived the idea of propelling airships with powder rockets of large dimensions. Although many patents were awarded the designer, the idea never materialized and has remained a purely theoretical venture in the annals of rocket 'plane history.

Many years later, in 1903 to be exact, a Russian experimenter named Ziolkovsky resurrected the idea of rocket flight. Having discovered the rocket capable of propulsion in a vacuum, in a report of his experiments he was so bold as to suggest its feasibility for space travel. Ignorant of the ridicule certain to befall the unfortunate who perceived such revolutionary ideas (even before man had learned to imitate the birds), Ziolkovsky was greatly disappointed when scorned by fellow scientists. Unfortunately, his disappointment was to last a lifetime, for it was only a few years ago that his countrymen acknowledged his genius and acclaimed the elderly experimenter.

However, the first indication of the soundness of the Russian's theories was given in 1919 when the American scientist, Dr. Robert H. Goddard, published the results of his own experiments with the rocket as conducted under the auspices of the Smithsonian Institute.

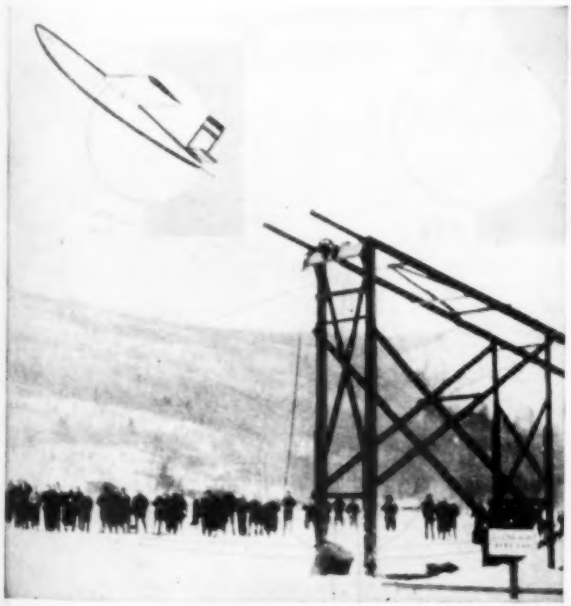
Although Goddard's interest in rocketry has been associated with the advancement of meteorology, the scientist has in the course of experimentation developed a basic system for the application of reaction propulsion to aircraft. Like Ziolkovsky, Goddard was quick to recognize the advantages of the rocket motor and quietly set forth to establish the primary formulas governing its use in aviation.

After many years of extensive research, he advanced a logical plan for the efficient adaption of rocket propulsion to aircraft. Utilizing a turbine wheel coupled to the propeller shaft and against which exhaust gases from a combustion chamber constantly discharged, he first indicated the feasibility of replacing the cumbersome gasoline engine with a light-weight rocket motor. It was further indicated that his mechanism could easily sustain the craft in thin air long after the propeller ceased to operate: This being accomplished by directing the exhaust discharge through nozzles situated in the rear of the fuselage.

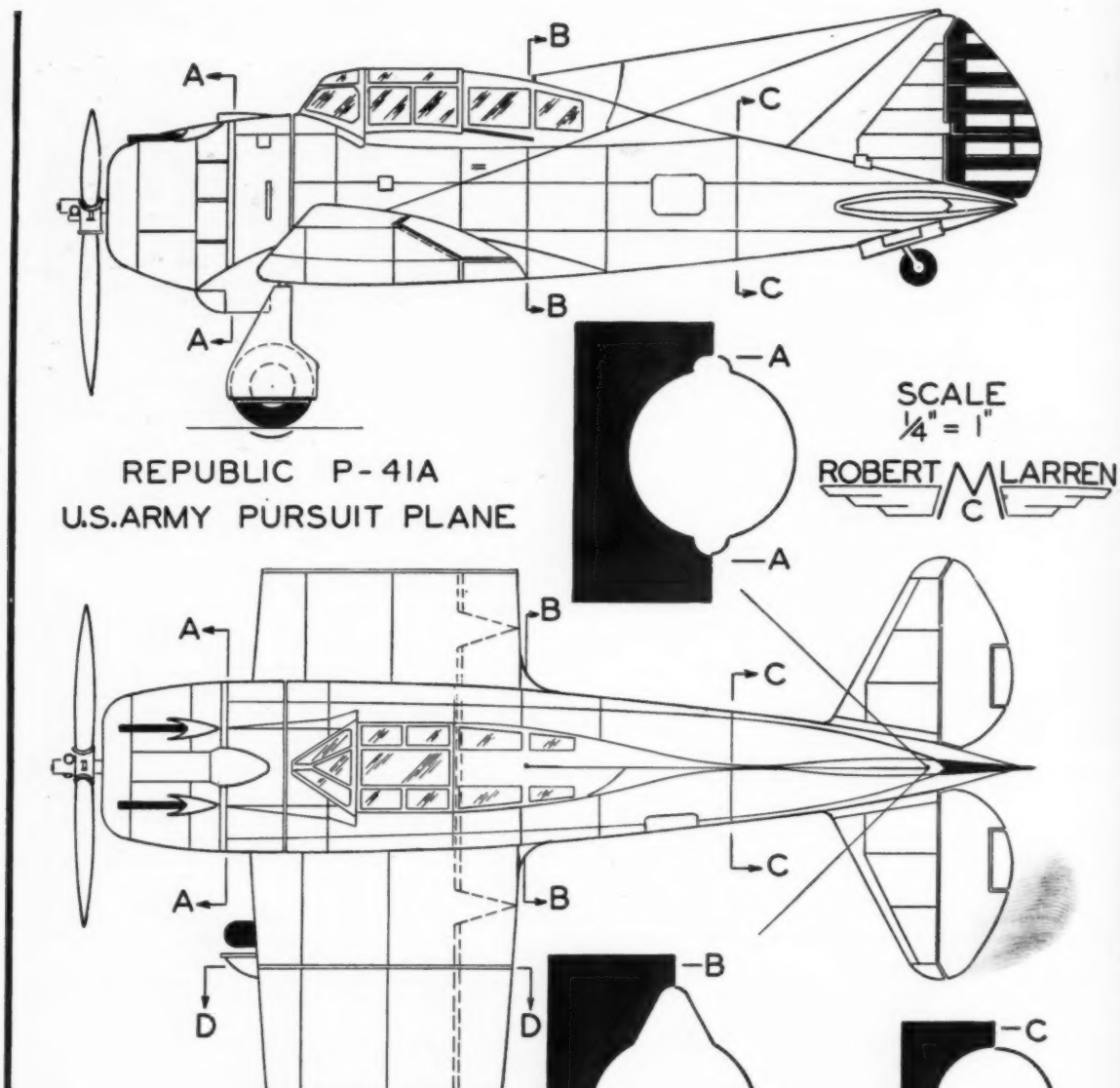
Although tne rocket motor had not attained perfection at the time Goddard's plan was advanced, persistence in rocket technique has recently warranted actual experimentation with such a device and, as will be indicated below, remarkable results have been attained.

The first instance in which a heavier-than-air machine was sustained in flight by rocket power was reported in Germany on June 11, 1928. The craft, a single place glider powered with a battery of powder rockets, similar to those used in the Coast Guard Service, took to the air and was successfully flown over a distance of one mile in record time. The results of this flight were indeed gratifying and research

(Continued on page 63)



At the right, the Klemin-Ley rocket mail-plane on the launching track at Greenwood Lake, being prepared for its take-off. Above the plane is shown as it left the track en-route supposedly to Hewitt, N. J. It crashed due to faulty balance


A
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SCALE
1/4" = 1"
ROBERT MCLARREN
REPUBLIC P-41A
U.S.ARMY PURSUIT PLANE
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D-D

Talons Of The U.S. Eagle

By ROBERT McLARREN

Uncle Sam's latest pursuit plane, the Republic XP-40. Speed 400 m.p.h. or more

THE name Seversky is magical! Ask any youth anywhere what that name means to him and he'll answer in one fervent word: SPEED! For speed has made that name and the tight, efficient, capable organization behind it. From the original Seversky SEV-3L (with its huge pants and the famed X-2106 license) through the long line of highly successful single and two-place fighting, training and speed ships has been the story of progress interwoven with investment; in money, in men, in visions.

And now, for the time being at any rate, the name Seversky has been erased from the aviation picture. We say "for the time being," for within a few short months Major Alexander P. deSeversky will once more be at the helm of a newer and perhaps greater aviation company.

By the vote of a stockholders' meeting, Sascha was relieved of the command of the organization he created, built and fathered and a new name: Republic Aviation Corporation has been given to the company. No other changes whatever; just "Good Morning, President Kellett" instead of "Seversky." The same trim lines, the same neat enclosure, the same high speed mark today's Republic pursuit ships, three of which we're going to describe this month.

Today's aviation progress is moving at blinding speed, so fast that we must speak of three separate and distinct models of the same ship to be accurate and up-to-

THE PLANE ON THE COVER

date. So here goes for the Republic Pursuit Ship XP-40, our Plane on the Cover for February.

Basically the new Republic Pursuit is the standard Seversky P-35 single-seat pursuit ship which has become so reknown as fighting members of the 27th Pursuit Squadron of the 1st Pursuit Group at Selfridge Field, Michigan. The trim, racy fuselage is built up on duraluminum formers and stringers covered with sheet Alclad stressed-skin to form an all-metal semi-monocoque structure. The wing is constructed of duraluminum ribs and stringers covered with sheet Alclad stressed-skin to form an all-metal full cantilever structure. The tail surfaces and landing flaps are constructed of stainless steel, the light strong, corrosion-resistant material now finding such great favor in our nation's great aircraft factories

After a year of satisfactory service tests at the Mount Clemens station, the air corps suggested certain changes to the Seversky organization, which in turn incorporated several more producing the new ships we feature this month.

First modification was the model XP-41 very similar in design to the famed P-35 but varying a great deal in detail. Basic modification of the XP-41 was the redesign of the famed "bath-tub" retractable landing gear of the P-35 and more applicable to the XP-35 experimental model. On this new design, the type shown in our three-view detailed drawings this month, the landing gear folds inward and upward

(Continued on page 54)

Does Aspect Ratio Increase Duration?

By GEORGE H. TWENEY

THE ratio of the span to the chord of an airfoil is called the Aspect Ratio and this is a very important factor in the design and performance of airplanes. It is, of course, always greater than unity, as the airplane wing works most efficiently when shaped to present its longest dimension perpendicular to the direction of motion.

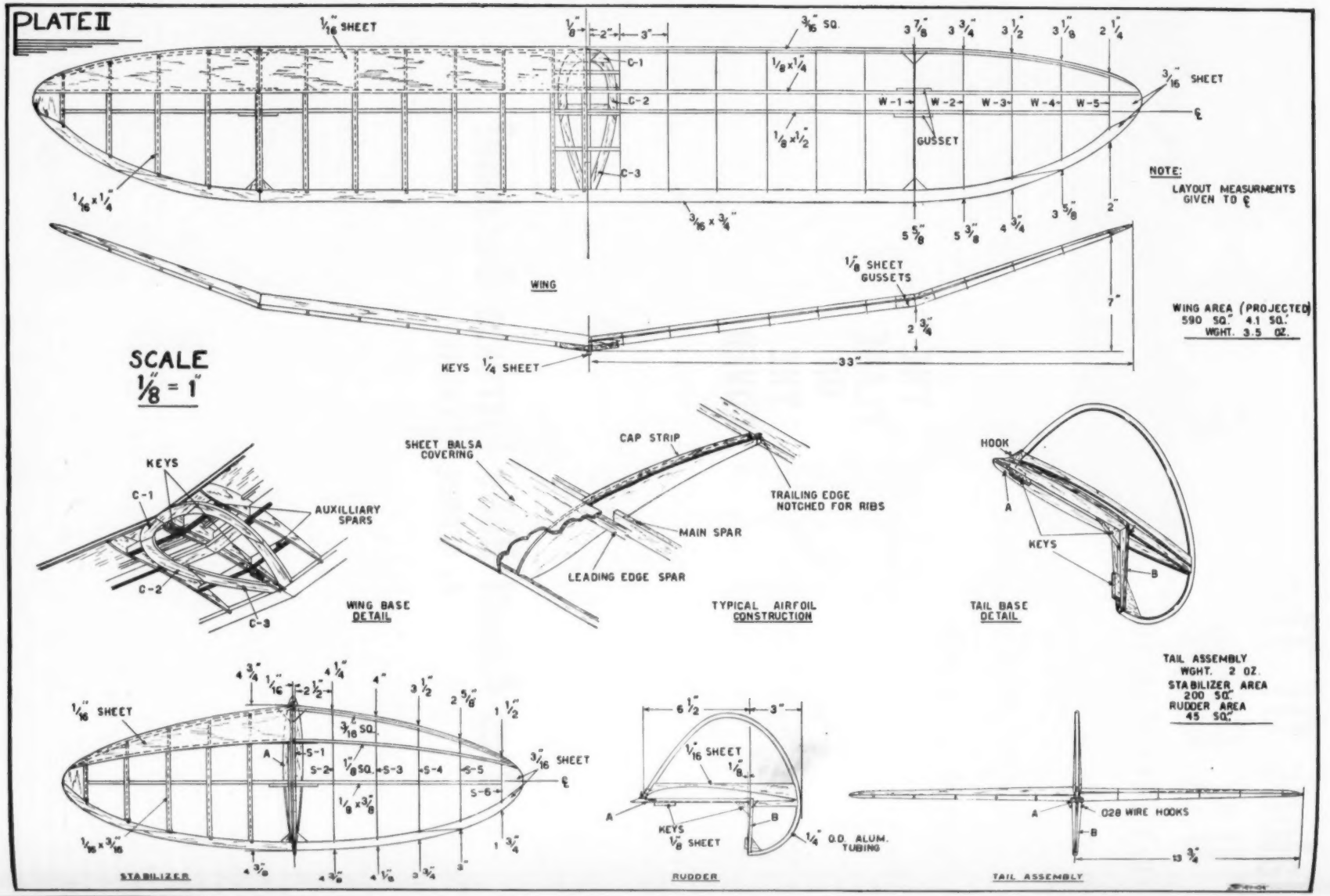
The importance of aspect ratio from an aerodynamic standpoint is apparent from a consideration of what is happening at the tips of an airfoil moving through the air. Since the pressure of the air below the wing is greater than that of the atmosphere, and that of the air above the wing less than atmospheric, there is a constant tendency for the air to flow around the end of the wing from the lower to the upper surface. This flow sets up vortices, or eddies, at the tip of the wing. In the production of these eddies, a considerable increase in drag is involved, because a definite amount of energy is required to set the air whirling, and this energy must be added to that required to drive the wing through the air. Since the eddies are torn off the wing by the forward motion as rapidly as they are formed, their energy is entirely lost, for they die out behind the wing on account of the internal air friction. As every wing must obviously have two tips, there is no way of avoiding this tip loss entirely and the next best thing is to have as little tip as possible in proportion to the area of the wing. This is accomplished by making the aspect ratio high; that is, by making the span of the wing great in proportion to its chord.

Wind tunnel tests have verified all these theories with respect to the drag of the tips of an airfoil, and even more in detail, have shown the variation in induced drag with aspect ratio. It is interesting to note how much the induced drag is reduced as the aspect ratio is increased, and as the higher lift coefficients are reached. This is very important where model airplanes are concerned, since they usually fly at relatively high lift coefficients and low speeds and any drag reductions become quite favorable.

The effect of the aspect ratio on the lift of a wing has also been demonstrated in wind tunnel tests. The effect on the lift is not as pronounced as the effect on the drag. However, the lift is increased as the aspect ratio is increased, so that the net result is again in favor of the model.

It is a well-known aerodynamic fact that for best all-round efficiency an airplane should fly at the best L/D value, which theoretically is the highest value. In commercial practice this is impossible, since large airplanes achieve their best control and best engine-propeller efficiency at a value below the optimum L/D ratio. However, for model airplanes, particularly long endurance indoor ships, the reverse is true. We adjust our models so that they fly at the highest possible lift coefficient, and we build them so the drag will be an absolute minimum. Thus, our models fly at the highest possible L/D ratio. In the face of this fact then, we should incorporate in our model designs those aerodynamic effects which will tend to increase the lift and reduce the drag:

(Continued on page 56)



How to Stunt Your Radio Airplane Quickly

THE SCALE

The K.G. LIVES AGAIN

How You Can Build a Modern Streamline Version of the Old Record-Breaking K. G. In Which Are Combined Super Soaring Qualities and a Skyrocket Climb

By HENRY STRUCK

The K-G-S is simply constructed, aerodynamically efficient and exceedingly sturdy

THE ENGINES WHICH MAY BE USED UNDER THE 1940 RULES ARE LISTED AT THE END OF THE ARTICLE

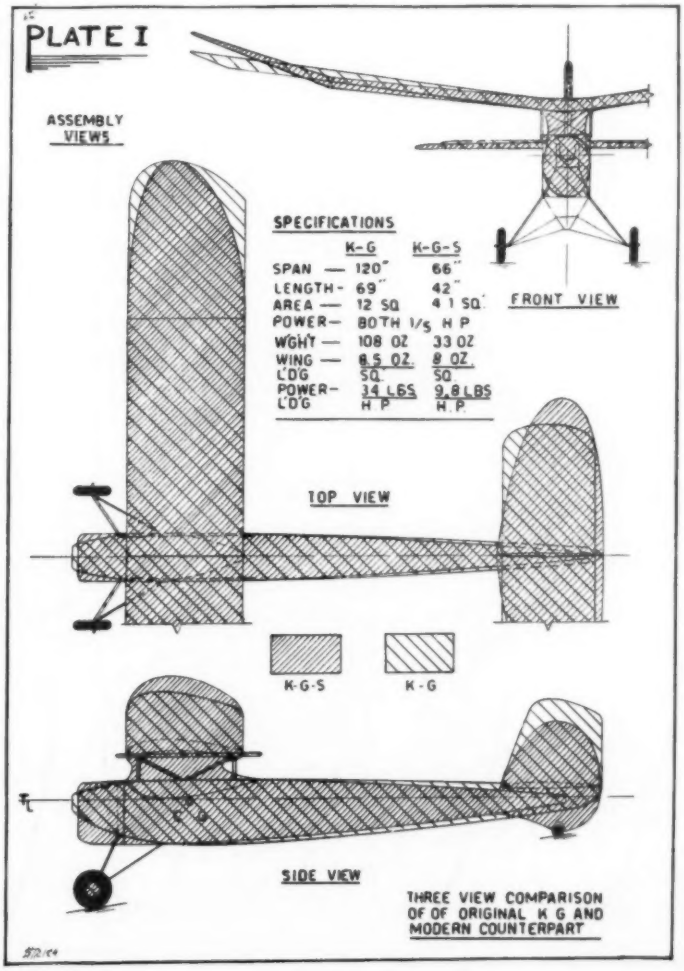
SCARCELY five years have gone by since the first gas models appeared on the contest field to be gaped at by crowds of spectators, most of whom came to see the crashes. Since then performance has improved so rapidly that even rules formulated to keep gas models in practical and safe limits became obsolete overnight.

The first ships—like all experiments—operated under no rules of any sort, though some method of control soon became necessary. A fuel allowance determined by the weight of the model was established. The first ratio was 1/4 ounce per pound, then 1/8 ounce and finally 1/16 ounce. When even the latter proved inadequate to reduce the number of "flown away" ships, a limited motor run of 45 seconds was introduced. Still performance soared. The limit had to be reduced to 30 seconds and finally to the current 20 seconds.

As the sport grew and attracted thousands of new enthusiasts, many new engines and planes appeared. Finally three general types of models were found to exist, so as a result three competitive classes were set up to permit the devotees of each group to compete with similar craft. Roughly these are: Class A with engines up to .2 cubic inch piston displacement; Class B up to .3 cu. in. and Class C up to 1.25 cu. in. Though much still remains to be done to improve contest specifications, the present rules should prove a good foundation for any possible future refinements.

At the last meeting of the Academy of Model Aeronautics numerous excellent suggestions were discussed; one of the most interesting being a proposal to determine the minimum weight of the model according to the displacement of the engine used. A simple system has been worked out in which the weight of the model equals the displacement of the engine multiplied by a predetermined number: 3 for Class A, 4 for Class B, and 5 for Class C. For example, a Class C engine of .3 cu. in. would require a ship of 1.5 pounds; a .6 engine, 3 pounds, etc. Obviously this will permit the smallest engine of each class to compete favorably with the largest and it will no longer be necessary to pack the most powerful engine in the smallest ship. Designs of greater efficiency in both engine and airplane will be at a premium and the field of experimentation will be broadened and not restricted to only one extreme.

However no matter what the rules are, or will be, the basis of a winning design is stability. Probably the first model to be designed primarily for stability was the original K-G, built in 1934 by Joe Kovel from complete designs and plans developed by Charles H. Grant. The success of this ship did much to popularize the sport of gas model flying. Though it was a miniature airplane rather than a model, its size and weight were no great handicap, for under a 1/8 ounce per pound fuel rule it set a world's record of 1 hour, 4 minutes, which it still holds today under this fuel allowance rule. Slowly the K-G passed from the contest picture as the trend



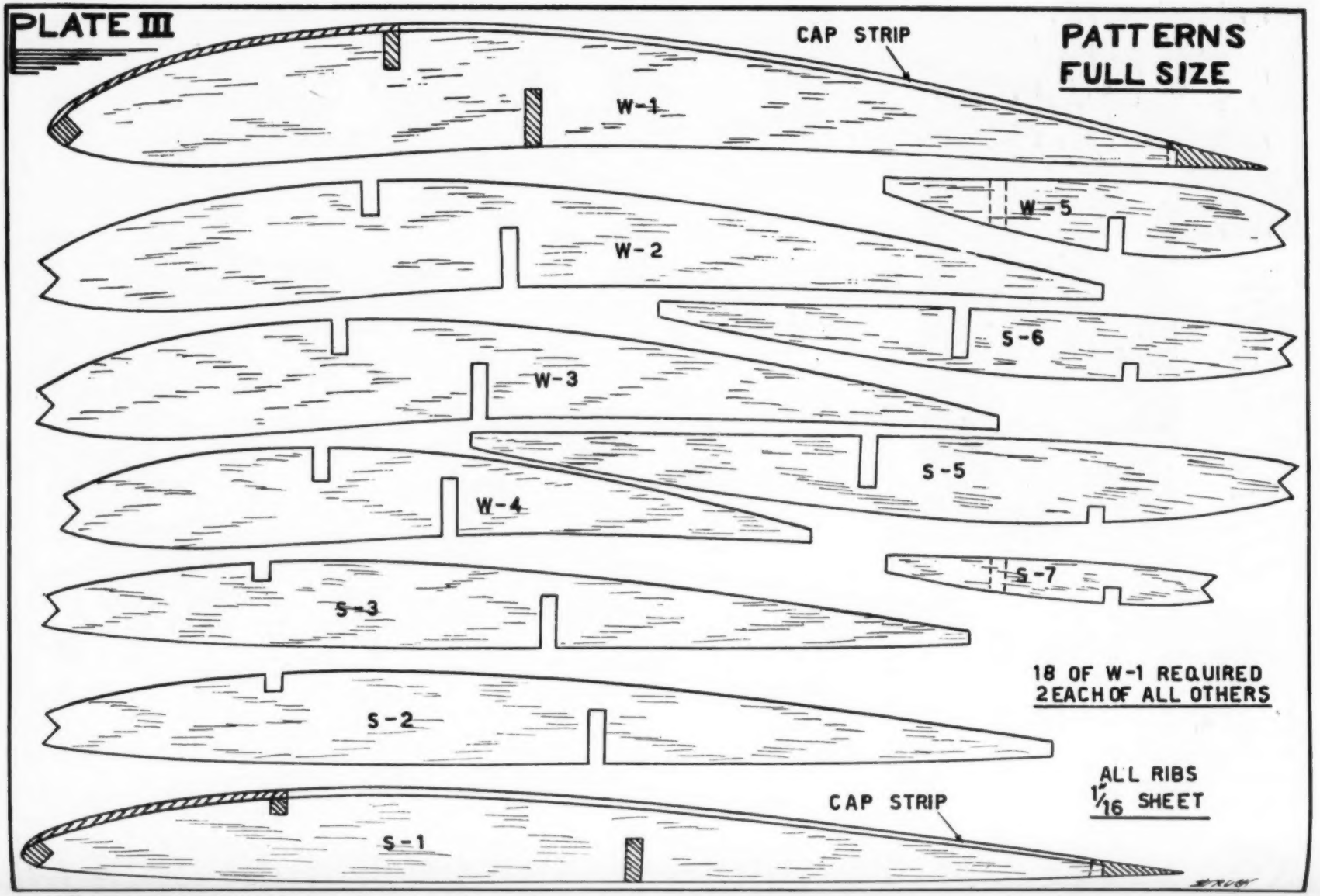
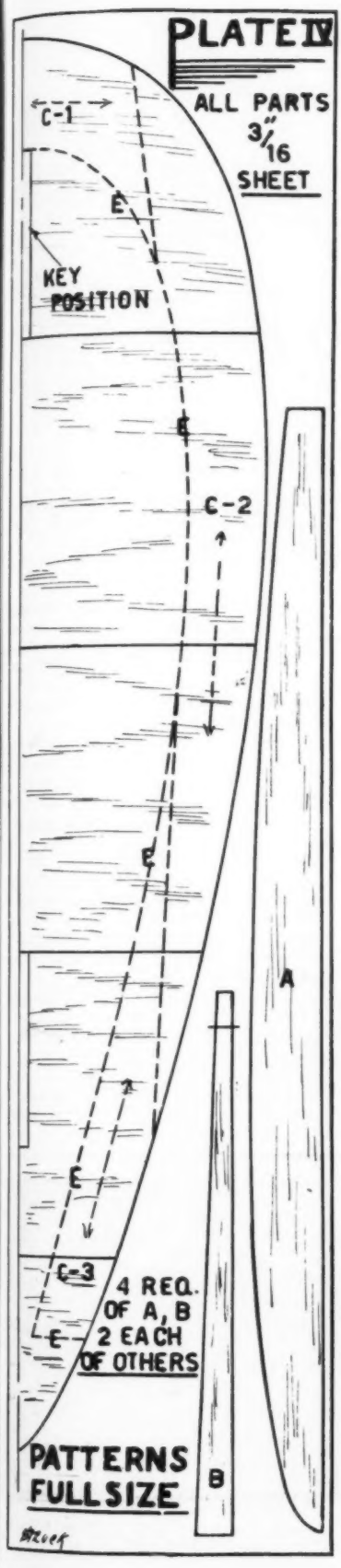


PLATE III
PATTERNS
FULL SIZE
CAP STRIP
W-1
W-5
W-2
S-6
W-3
S-5
W-4
S-7
S-3
18 OF W-1 REQUIRED
2 EACH OF ALL OTHERS
S-2
ALL RIBS
1/16 SHEET
CAP STRIP
S-1



of design moved toward smaller, more powerful ships.

The high speed of the modern model planes puts even greater stress on the principles of stability. What could be more logical then, than to revise the construction of the old K-G to meet the specific demands of present day contest flying? Though the new ship scarcely resembles the K-G in outward appearance, a brief examination of the three-view assembly plan will reveal that the arrangement of aerodynamic forces is identical. Every effort has been made to achieve maximum duration through effective streamlining and minimum weight, and many desirable features have been incorporated in its construction. The all balsa fuselage can be doped or varnished to resist the ravages of gas and oil and the rough handling a gas model is bound to get. The wing and tail construction offer great strength with light weight. The ship can be dismantled and reassembled with exactly the same settings by a number of "keys." The entire motor unit can be quickly removed for checking and servicing.

From its initial test the new ship performed up to all expectations. In fact in its first contest the K-G-S made the longest flight of the day, 4 minutes, 38 seconds, on a 17-second motor run, in spite of a scarcity of thermals, and also turned in the best three flight average.

Even more conclusive are the innumerable tests that have been made to discover its reactions under maladjustments. Left- or right-thrust merely altered the power circle, while up-thrust caused it to hang on the prop while climbing. Only slight adjustments of the rudder were needed to obtain any size gliding circle desired.

So, we are happy to present the K-G-S; stable, strong, efficient and controllable—an ideal high-power contest gas model.

Spectators witness a "no push" take-off after an unbelievably short run

Construction Notes and Material List

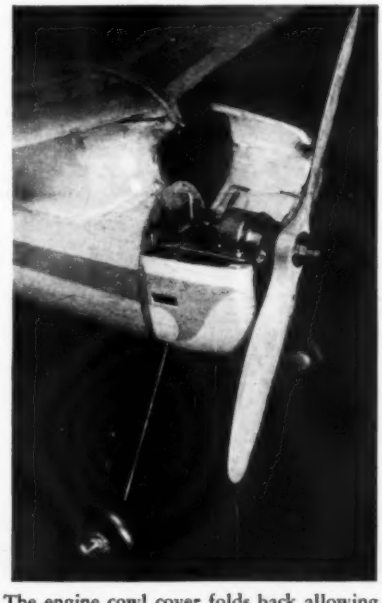
The plans have been carefully prepared with all essential parts shown full size and illustrated with numerous sketches. In Part I the wings and tail assembly are to be described in the hope that a proper amount of time will be spent on them. Many builders in their rush to get out and fly their new model produce "butchered" or warped units that are often the cause of disastrous crack-ups.

Obtain the best possible balsa of the grade specified, as it will not only assure a better model, but prove a pleasure to work with.

Material List for K-G-S

(4) 1/16x 2x36—Soft balsa
Stabilizer leading edge cover, ribs.
(2) 1/16x 3x36—Med. balsa
Wing leading edge cover.
(8) 1/8x 2x36—Soft balsa
Bulkheads, planking.
(2) 3/16x 2x36—Med. balsa
Trailing edges of tips, fillets and pylon formers.
(5) 1/8 sq. x 36—Med. balsa
Inner frame of fuselage.
(3) 3/16 sq. x 36—Med. balsa
Leading edges.
(4) 1/16x1/4x36—Soft balsa
Cap strips.
(3) 1/8x1/4x36—Hard balsa
Leading edge spars.
(3) 1/8x1/2x36—Hard balsa
Mainspars.
(2) 3/16x3/4x20—Med. balsa
Trailing edge.
(1) 6x4, 1/16" plywood
Front bulkhead.
(1) 3x3, 1/8" plywood
Motor bulkhead.
24"—1/8 wire
Landing gear.
12 sheets tissue
Covering.

(Continued on page 50)



The engine cowl cover folds back allowing access to the engine unit

After the take-off the climb is steep and fast

Conference delegates assembled beneath the U. S. Army Bomber B-15 during their inspection of Langley Field laboratories

N.A.A. OFFICIAL
MODEL AIRPLANE NEWS FROM ALL PARTS OF THE WORLD

What Happened at the 2nd Annual Model Airplane Conference Held at Old Point Comfort, Va.

BY BOAT, plane, train, automobile and even bicycle, more than 125 model aviation enthusiasts, many of them outstanding contestants and leaders, headed into Hampton, Virginia, late last November to attend the Second National Model Aircraft Conference.

The Fall meeting of the Academy of Model Aeronautics was also held at the same time. Conference headquarters was the Chamberlin Hotel situated on the Fort Monroe Army Reservation at Old Point Comfort, adjoining Hampton. Registration opened on the evening of Friday, November 24, under the direction of Walton Grubbs, secretary of the N.A.A. Model Division.

First arrival turned out to be the most distant traveler, John Clemens of Dallas, Texas. Next to show up was Harry Vogler of Pittsburgh, Pa. From then on the conference registration tables were busy as model aero-luminaries poured in. Before registration was completed the next morning, Saturday, Nov. 25, the following states were represented: Maryland, Virginia, New York, Michigan, Illinois, New Jersey, Pennsylvania, West Virginia, Ohio, Connecticut, South Carolina, Massachusetts, Texas, the District of Columbia and the Borough of Brooklyn, N.Y.

From South Carolina came Jimmy Metchicas of Greenville, representing the Torque Flyers club. From Detroit, representing the Detroit Junior Chapter of N.A.A. came Frank Dallaire, accompanied by his son, Joseph. Miss Frances Alexander represented the Akron model building group and Russell L. Webber, president of the Gas Model Aeronauts of Chicago, came as his group's spokesman.

Registration closed at the Chamberlin at 9:30 A.M. Saturday morning and everyone sped out to Langley Field to visit the National Advisory Committee for Aeronautics' headquarters. At the field, which houses besides the N.A.C.A., the U. S. Army's G.H.Q. Air Base headquarters, the aero-modelers "rallied 'round the flag pole" opposite N.A.C.A. administration building.

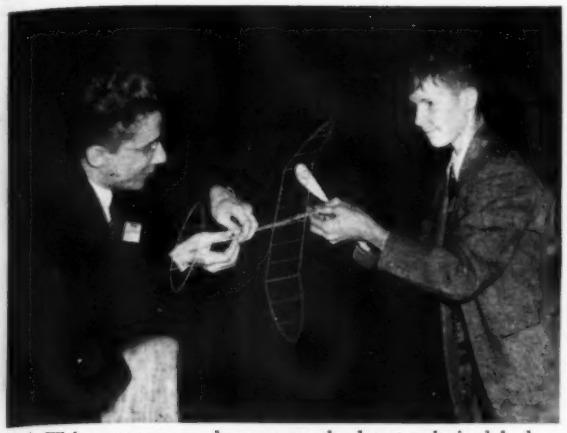
N.A.C.A. Laboratory Tour

Before making a tour of the laboratories the model building group split into three parties designated as red, white, and blue groups. Each of the parties, under the guidance of an N.A.C.A. official and accompanied by an army officer, had the opportunity of seeing the famed engine-testing laboratory, large propeller research wind tunnel, vertical spinning wind tunnel, free flight wind tunnel, hull-testing tank, as well as the 19-foot pressure wind tunnel. A few of the high lights of the tour included the demonstration in the engine laboratory of new cooling fins applied to present motors which increase the latter's efficiency about 300% with present-day fuels.

The interested visitors saw newly-developed safety aviation fuels in which scientists actually extinguished flaming blow-torches. In the vertical spinning tunnel, delegates witnessed flights of a small model which showed the spinning characteristics of certain designs. One of the most interesting demonstrations was made in the free-flight wind tunnel by a model plane

Abrams addresses the conference. Other speakers on the left included Mr. Sharp of the NACA, Reid and other prominent persons

Some of the models on display in the lobby of the Hotel Chamberlin. Delegates in the background discuss pros and cons



Herb Weiss prepares to demonstrate the latest polorized hydrogen atom covering for indoor models.—???

Harvey Barkley and his successful gas model autogyro which he exhibited at the conference. The wind wrecked it when flown

of approximately 4-ft. wing span which took off and flew under its own controls in the air stream created in the tunnel. The plane's controls were actuated by researchers standing outside the tunnel and motivated by electrical impulses passing through a slack wire attached to the model. This wire in no way supported the craft and the ship "flew" in the tunnel by creating sufficient lift through its own airfoil surfaces.

A bit beyond noon, convention members left the N.A.C.A. laboratories and partook of sustenance before gathering at the Hampton City Hall for the Second National Model Aircraft Conference. The conference was opened at 2:30 p.m. by Albert L. Lewis, director of the N.A.A. Model Division.

Model Aircraft Conference Speakers

Conference speakers included H. J. E. Reid, Engineer-in-charge, N.A.C.A.; Major Ned F. Schramm of the G.H.Q. Army Air Force; E. R. Sharp, administrative officer, N.A.C.A. and sponsor of Hampton Roads Chapter, Virginia Model Association; Eastman N. Jacobs, N.A.C.A.; Herbert K. Weiss, U. S. Army Coast Artillery Board; Leon Shulman, well-known gas model designer; Clinton B. DeSoto, assistant secretary of the American Radio Relay League; Ernest Gamache, executive director, Air Youth of America; Carl Goldberg, well-known model designer; Curtis Janke, of Sheboygan, Wisc. (paper read by Lawrence Smithline); Frank Zaic, internationally-known model aviation authority; Lloyd Barclay, N.A.C.A.; Charles H. Grant, editor of MODEL AIRPLANE NEWS; and Benjamin Shereshaw of the Kresge Aero Club, Newark, N.J.

A complete presentation of the talks delivered at this conference would fill several issues of this magazine and are available in the Academy's "Journal," Vol. 2, No. 3.*

The following excerpts from a few of the leading papers presented are of special interest. In his talk, Mr. Sharp made the following recommendation—"Rules should be so drawn as to give a distinct advantage to the contestant who is flying an original model—one of his own design and construction. Perhaps I feel more strongly on that point because I have been so long acquainted with the N.A.C.A. which places a premium on original thinking. However, I claim no original thought in advancing this idea and I am sure that many of you share it with me. I think perhaps something like double-credit should be given an original model over a kit model. This would encourage originality in design and should help model aeronautics. May I recommend to you that you give serious consideration to this matter." This portion of the speaker's talk met with enthusiastic reception.

Mr. Weiss presented some very interesting facts regarding model helicopters and Curtis Janke made a plea for more indoor flying. One of Janke's arguments was: "Any model meet should be, in the final analysis, a test to determine the best model or the one most cleverly flown. Any indoor builder will tell you that low-ceiling flying requires as high a degree of skill as a record attempt in the Lakehurst airship hangar."

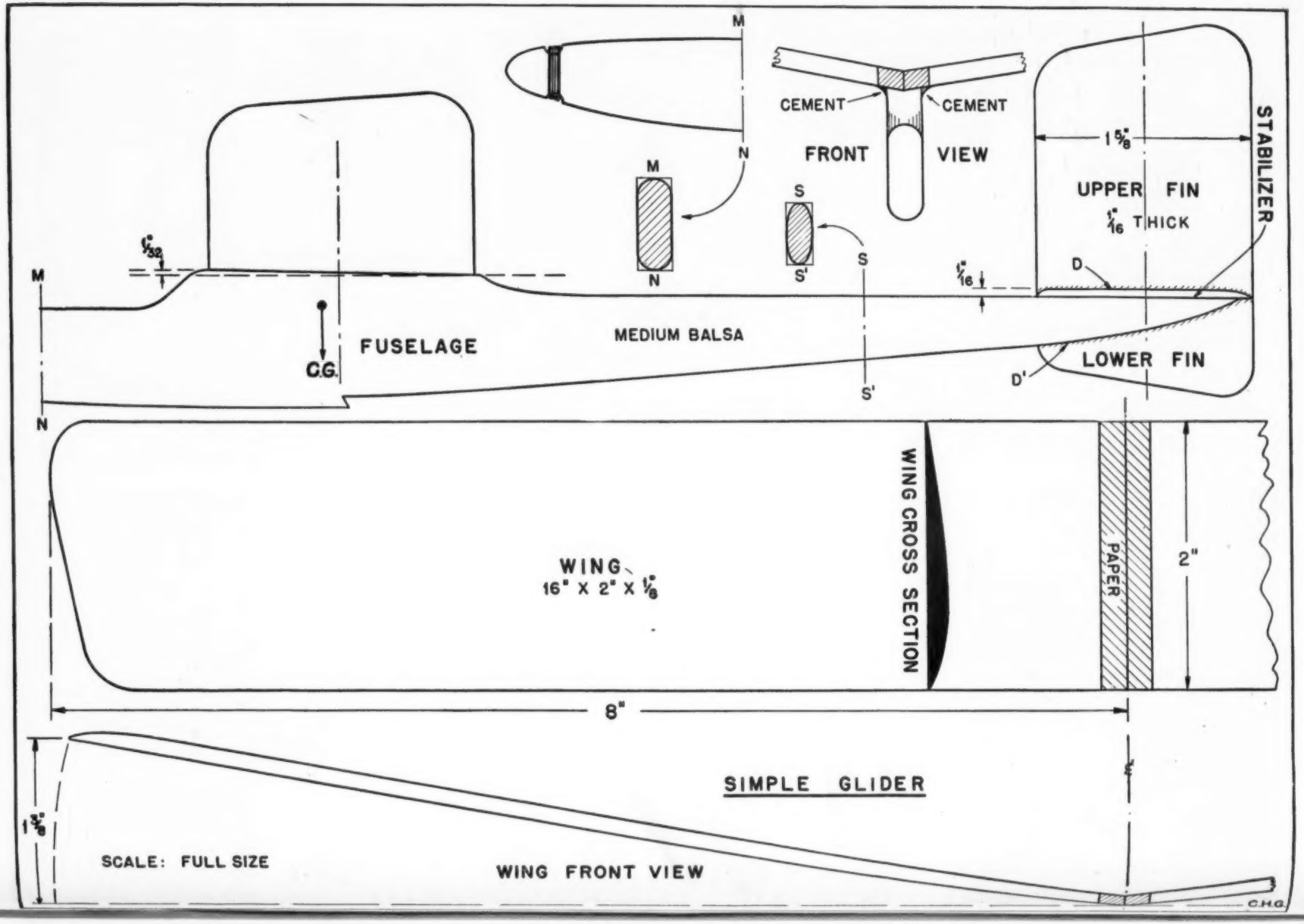
(Continued on page 58)

* Published by the Academy of Model Aeronautics, 1909 Mass. Ave., N.W., Washington, D.C.

Herbert Weiss demonstrates his model helicopter at the conference banquet. It is perfectly stable

Presiding officers at the Academy meeting. Al Lewis, Sec.; Ed Roberts, Pres.; Irwin Polk, Vice-Pres.; Carl Goldberg, Vice-Pres.

Three o'clock in the morning: Delegates at the Academy meeting struggle in deadly combat to create satisfactory rules for 1940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PAPER
2"
8"
SIMPLE GLIDER
1 3/8"
SCALE: FULL SIZE
WING FRONT VIEW
C.H.G.

Chapter 1—Article 7

By

CHARLES HAMPSON GRANT

FUNDAMENTALS OF MODEL PLANE DESIGN

Designing the Tail Surfaces and the Final Layout of the Glider—How to Build and Fly It

TO LAY out the design of a simple glider is an easy matter, provided a few basic rules of design are known. A glider is the simplest type of airplane and it embodies the fewest number of design problems. Therefore the design of such a plane has been undertaken as the first project in this series of articles, written for the beginner in model design and building.

During the course of laying out the design of the glider, simple rules of design have been given and the underlying principles explained. So far a number of its definite characteristics have been established as follows:

The wing span = 16 inches; the wing chord = 2 inches; the stabilizer moment arm = 6 inches; the stabilizer area = 10.7 square inches; the wing dihedral = 1-3/8 inches rise of each wing tip above the center point of the wing.

It has been explained also how the wing should be shaped and fitted together to form the correct dihedral. (All readers who have not read the first articles of the series should do so in order to understand subsequent explanations.)

The Fin

There remains now only a few points to consider before you can start the construction of the glider. The first one is the size of the fin or vertical tail surface. The area of this surface should be 1/10 the area of the wing, *when the moment arm is equal to one-half the span.* This relationship is correct for nearly all gliders or rubber powered models except contest models or those with very large propellers. It is an excellent general rule to follow.

As in the case of the stabilizer, the fin area that should be used depends on the distance from the center of the fin to the center of the wing. Usually the fin is located at a distance from the wing equal to one-half the wing span. (This distance is called the "fin moment arm.") The value of the fin area given as 1/10 the wing area is correct for a fin moment arm of one-half the wing span. If the moment arm is longer than this amount, the fin may be smaller. If it is shorter than one-half the wing span, the fin should be proportionally larger than 1/10 the wing area.

By applying the general rules to our glider we find that the fin area should be equal to 1/10 of 32 square inches or 3.2 square inches in area, provided the moment arm is equal to half the wing span. However the moment arm of the *stabilizer* is only six inches. (The span = 16 inches.) The *fin* moment arm should be the same length, as the fin normally is placed the same distance from the wing as the stabilizer. It is quite simple to determine the correct fin area for this moment arm length of six inches.

The product of the fin area and the moment arm should be the same in the case of all gliders with wings of the same area and span. We know that the fin area should be 3.2 square inches, when the moment arm is eight inches. The produce of these is $3.2 \times 8 = 25.6$. Then, as the fin moment arm of this glider is to be 6 inches, the fin area should be:

$$\frac{25.6}{6} = 4.27 \text{ square inches.}$$

If the wing area, wing span and moment arm length of any glider or average type plane is known, the correct fin area may be determined by the following simple formula:

$$A_F = (0.0625)\ \frac{AS}{M_F},$$ in which A_F = fin area; A = wing area; S = wing span; and M_F = the fin moment arm.

The moment arm may be calculated from the formula as follows:

$$M_F = (0.0625)\ \frac{AS}{A_F}.$$

Having determined the correct size and position of the tail surfaces relative to the wing, the next step is to establish their correct proportions or shape.

Stabilizer Proportions

In order to keep the problem of design simple, the stabilizer will be made rectangular, or approximately so. Only the corners will be rounded. The aspect ratio of the stabilizer should be about 4. That is, the span should be about four times the chord. The proper proportions, then, may be found by means of the following formula:

$$C = \frac{\sqrt{A_S}}{R_a},$$ in which C = chord; A_S = stabilizer area and R_a = aspect ratio.

The correct proportions also may be determined by a scanning process, or trial and error method, as follows:

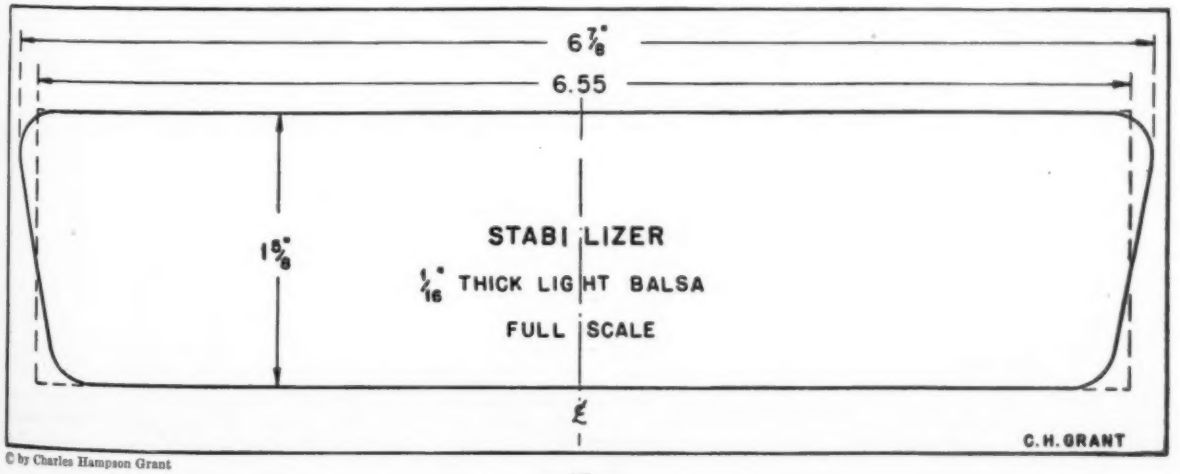
If the chord of 1.5 inches is selected, the span would be $4 \times 1.5 = 6$ inches. Then the area would be equal to $6 \times 1.5 = 9$ square inches. This is a little too small, so a slightly larger chord should be chosen; say, 1.6 inches. This will give a span of 6.4 inches and an area of 10.24 square inches. This is only slightly too small, so a chord of 1-5/8 inches and a span of 6-1/2 inches should be about right.

Now calculating the chord by the formula, we have:

$$C = \sqrt{\frac{10.7}{4}} = \sqrt{2.675} = 1.63 \text{ inches.}$$

This is equivalent to about 1-5/8 inches.

(Continued on page 52)

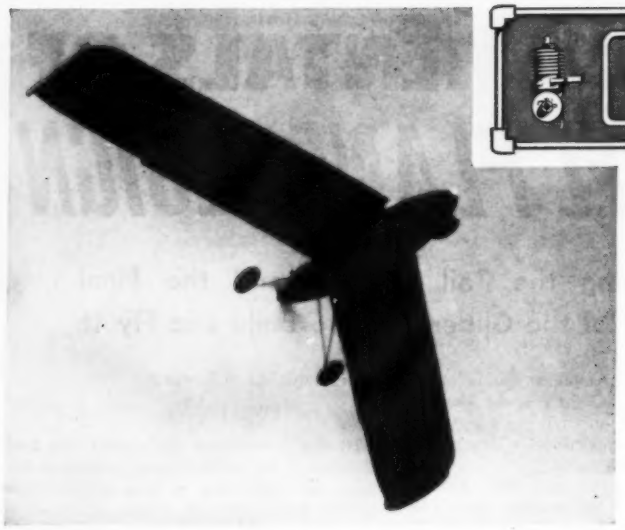


© by Charles Hampson Grant

GAS LINES

A GRAPHICAL EXPLANATION OF VARIOUS GAS MODEL RULES

Gas Model News From All Parts of the World



Pict. 1. Fred Kulick's steady flying "tailless" passes overhead

THE most vital question that has come up in the last year or two, and one which affects nearly all gas model builders, is: "What shall the gas model rules be?"

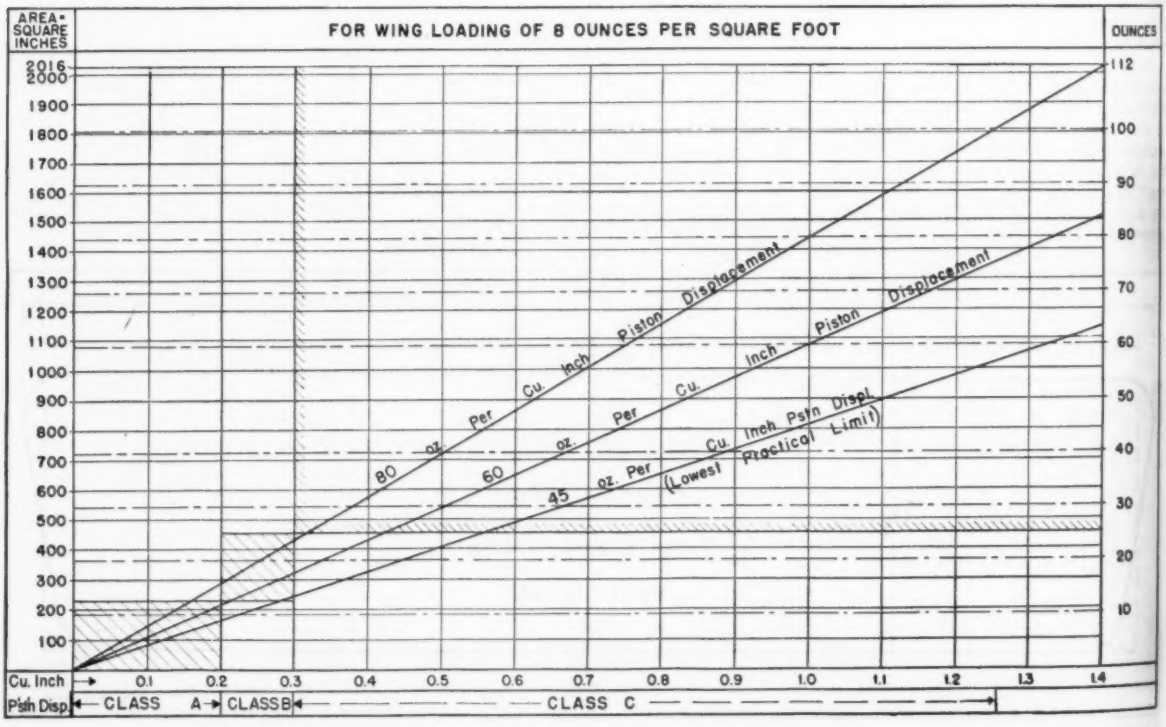
Nearly every model builder has a decided opinion concerning this matter. Many of these opinions have come from careful thought and analysis and are based upon a thorough understanding of the significance of various rules. However, in other cases, the opinions, though decided, are based upon a misconception or lack of understanding of what any definite rule will encourage and bring forth in gas model activities.

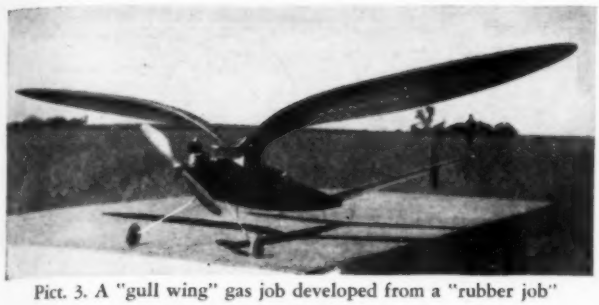
Therefore, this month, we will endeavor to draw the curtain of mystery from the conditions surrounding the rules and to show the significance of the various factors which must be considered in making any particular rule.

Before one starts to make a rule he must have a premise or some objective. We believe that the majority of model builders wishes as much scope in the designing, building and flying of models as possible. In other words, there should be few restrictions. These restrictions which are placed on gas models should be only those that contribute to safety or encourage the acquisition of aeronautical knowledge and the expansion of the entire field. Safety is an important element inasmuch as upon this the allowance of protective insurance depends. In other words, rules must be such that they discourage or eliminate dangerous types of planes.

Now, in order to visualize the factors involved, we suggest that you scan the graph at the bottom of the page. On the left of the graph is a table of wing areas in square inches. Solid horizontal lines run from the hundreds values to the right across the graph. On the left is a table, in ounces, of the total weight of an airplane, based upon wing loading of eight ounces per square foot. These figures show the weight that any airplane must be with any given wing area indicated on the left side of the graph, with a wing loading of eight ounces per square foot.

For example: if a plane has 900 sq. in. of wing area, follow the solid line across the graph to the right until you come to the table of ounces. Besides this 900 line, 50 oz. appears. In other words, for a wing area of 8 oz. per sq. ft. and a wing area of 900 sq. in., the plane should weigh 50 oz. If you wish to find the wing area for any given weight, follow the dotted line from the oz. table to the left, across the





Pict. 3. A "gull wing" gas job developed from a "rubber job"

Pict. 2. Bruce Donlan and his all-balsa "gull wing"

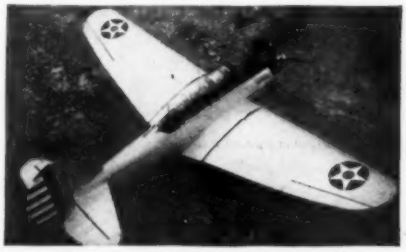
graph, and read the wing area in the left-hand area column.

Now look at the bottom of the table. Here we have indicated piston displacement in cubic inches. This makes it possible to select any point on the face of the graph and determine the cubic inch piston displacement in ounces of total weight and the wing area of the plane it represents.

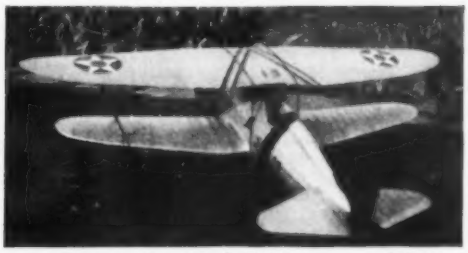
Now suppose we attempt to lay out the areas, on the graph, which the 1939 rules represented. Within these various areas any point represents a plane with definite specifications for weight, area and power. The cu. in. piston displacement of Class A planes runs from zero to, and including, 0.2. The wing area for such planes runs from zero to 225 sq. in. In other words, on the graph, planes that could be built in Class A are represented by the points within the cross-hatched area in the lower left-hand corner. Similarly, points which represent planes which may be built in Class B are shown in the cross-hatched area to the right and upward of Class A. The Class C area is bounded by the vertical and horizontal lines along which the cross-hatching appears.

One of the features which is impressive, after consideration of the 1939 rules as shown on the graph, is the fact that they are very restricted in Classes A and B. In the blank column above the Class A area no planes could be built; nor could planes represented by points in the blank column above the Class B area be considered for contests. There has been considerable dissatisfaction with the *(Continued on page 29)*

Pict. 4. Rey Arden and his first-place winner



Pict. 6. A perfect scale gas job

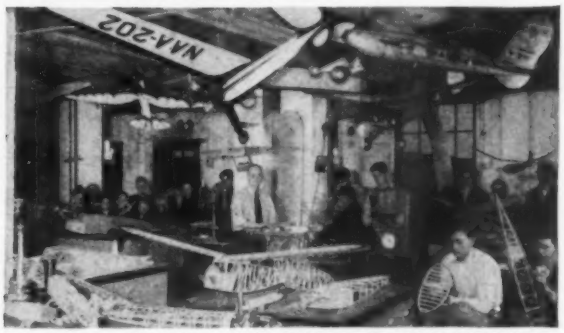


Pict. 5. A successful biplane gas model

Pict. 7. Activity at the Wannalancit contest

Pict. 8. The Model Aircraft Club of Long Island contest

Pict. 10. Model Wings Flying Club display, Pittsburgh



Pict. 9. Workshop of the Wichita, Kan., Model Club

The Physics Of The Airplane

The Principle of Archimedes As Applied to the Science of Aeronautics

By LT. JAMES P. EAMES and WILLIS L. NYE

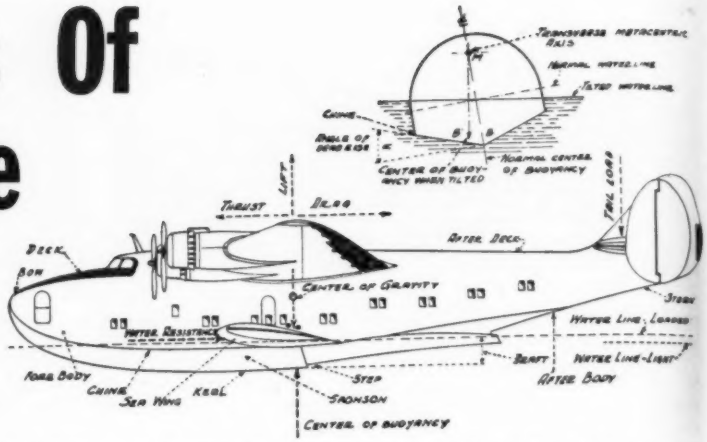


Fig. 4. The principal nomenclature of a seaplane (Boeing 314) and the metacenter

Article 13

WE ARE all very familiar with the elementary phenomenon that bodies are lighter in water than they are in air. A simple experiment which can be readily performed by the reader, should he so desire, consists in first suspending a pound of iron from the hook of a common draw scale. Then partly immerse the iron in a suitable container of water which can easily be brought up to a position beneath the hook of the scale. It will be immediately noticed that the weight tends to decrease. Further immersion of the iron results in a correspondingly greater loss of weight. However, from the following complete immersion of the iron specimen it becomes significant that the loss of weight does not increase with the depth to which it is submerged.

It is assumed that the above experiment would be performed with fresh water. Should salt water be employed, the apparent loss of weight of the iron specimen will be found to be greater. Conversely, should aviation gasoline be used; for instance, the apparent loss of weight will be less. The same laws which govern this phenomenon would again be exhibited should we immerse our same specimen in mercury. To our surprise, the iron tends to float upon the surface of this medium. Why? Although both water and mercury are liquid media, the density of the former is less than that of the iron, while that of the latter is of greater value. This fact brings us to a consideration of the term "density."

We know that materials of different kinds may possess the same physical dimensions or bulk and yet exhibit a great variation in their respective weights. For instance, a steel specimen will weigh 40 times as much as a cork specimen possessing the same physical dimensions. We may also say that the mass of the steel specimen is 40 times as great as that of cork. The difference between the weights of the two substances is expressed as a difference in density.

From the foregoing fact we might evolve a definition for this quantity as follows: The density of a substance is the number of units of mass of the substance contained in a unit of volume. We can also transpose this statement into equation form:

$$\text{DENSITY} = \frac{\text{MASS}}{\text{VOLUME}} \quad \text{or} \quad d = \frac{m}{v}$$

The numerical value assigned to the density of a substance becomes dependent upon the type of units in which the mass and volume of the material are measured. Thus, in the Centimeter-Gram-Second (c.g.s) system, the density is the number of grams per cubic centimeter. In the British systems, it is the number of pounds per cubic foot. The problem of density is very important in aeronautical design because the density and the physical characteristics of a material in relation to the stiffness determine to a large extent, the type of material which may be used; i.e., ferrous or non-ferrous or wood or plastic. Airplane spruce weighs 34 pounds per cubic foot.

As an example, assume that a sheet of chrome nickel alloy steel, from which aircraft wing fittings are to be blanked out, has the dimensions: 20 x 50 x 1 cm., and weighs 7.8 kilograms. Thus, the volume of the sheet is seen to be 1,000 cubic centimeters and its weight is 7,800 grams. By application of the above equation, the density of the steel is found to be:

$$d = \frac{m}{v} = \frac{7800}{1000} = 7.8 \text{ grams per cubic centimeter,}$$

or in abbreviated form, 7.8 g/cm.³

The hypothetical example is merely illustrative of the use of c.g.s. units of measurement. In such a case in actual practice, British system units would be employed.

Specific gravity is a factor which is very closely related to density. It is defined as the ratio of the weight of a body or substance to the weight of an equal volume of water. This definition is capable of expression in a slightly different manner, wherein specific gravity is

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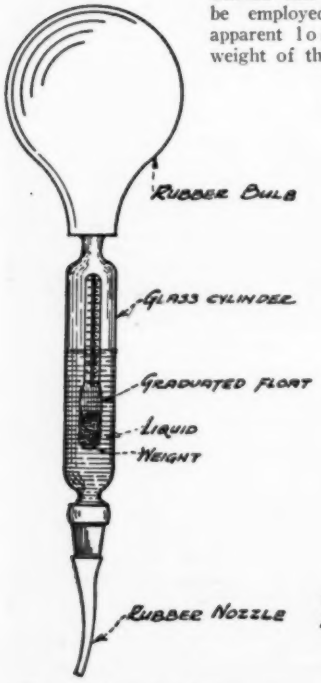


Fig. 3. A typical hydrometer

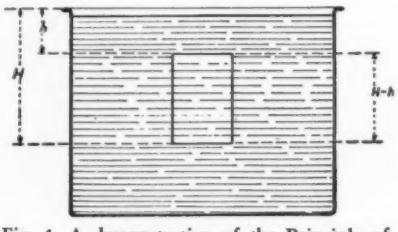


Fig. 1. A demonstration of the Principle of Archimedes

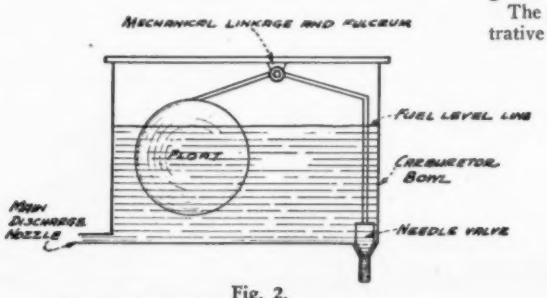


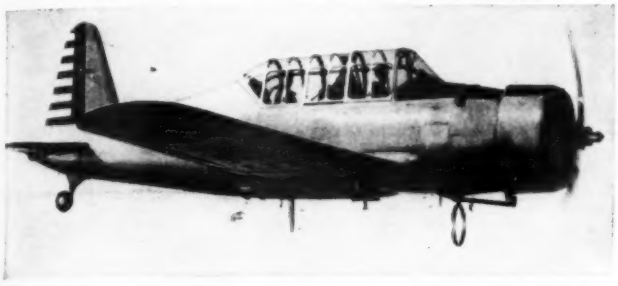
Fig. 2. The basic fundamentals of the carburetor

FRONTIERS OF AVIATION

Highlights of Planes That Are Fighting the War in Europe

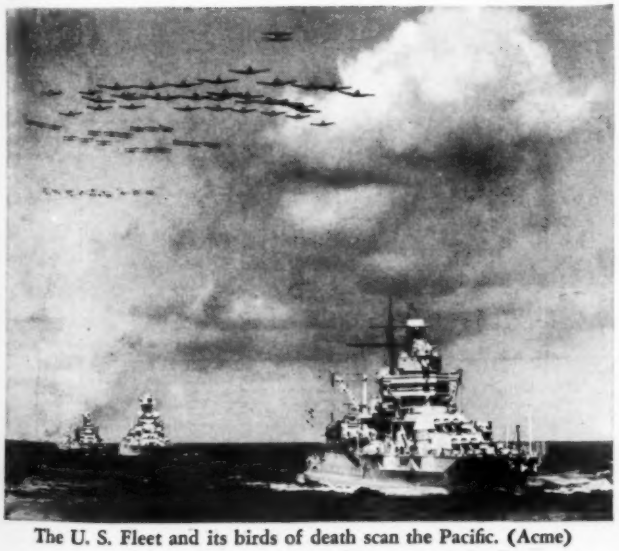
By ROBERT C. MORRISON

A close-up view of the nose of the sensational new Curtiss P.42. Believe it or not, the cowling houses a Wright Twin-Row radial engine of high horsepower. At last a radial, perfectly streamlined



The Vultee Valiant, a new light combat and training plane, designed especially for export and home defence. (Acme)

A Flying Fortress drops its load at recent tests at Langley Field, Va. (Acme)



The U. S. Fleet and its birds of death scan the Pacific. (Acme)

THE new designs from Germany are appearing. Heinkel, Junkers, Dornier, Arado, Henschel, Blohm and Voss, Focke-Wulf, and Messerschmitt are the German aircraft manufacturers that Hitler is depending upon to win the war. In looking over their new creations, that have just rolled out the doors of their plants, we never thought such a conglomoration of aircraft could be gotten together at one time. The airplanes we personally like in Germany's airforce, the "Luftwaffe," were the Heinkel He 111K powered by Daimler-Benz engines and the Messerschmitt BF-109 single-place pursuit. The Dornier twin-engined Model 215 bomber and the Heinkel He 112 pursuit are also good airplanes.

Heinkel, with one of the newest and largest plants, is by far the leading aircraft manufacturer in Germany today and all of its products have been outstanding; the He 111K dominating about half of the German air force. It is a very clean twin-engined, gull-winged bomber powered by "V" engines. It cruises along normally at 214 m.p.h. with full load and can reach 260 m.p.h. for a few minutes as its maximum speed. In the overload condition the He 111K can carry a little more than two tons of bombs.

The 900 hp. Bristol Perseus sleeve-valve engine. The most successful one in the world

Its Daimler-Benz engines produce about 1,000 hp. each and with their small frontal area they fit well on the airplane. However, of late, the Heinkel company has shown signs of being rushed to supply the war with enough weapons to keep it going. Modifications to the Heinkel have been slip-shod and the once graceful HE 111K is now adorned with some ugly-shaped, fixed gun turrets at both top and bottom of the fuselage. So much attention was given to the streamlined shape of the fuse-

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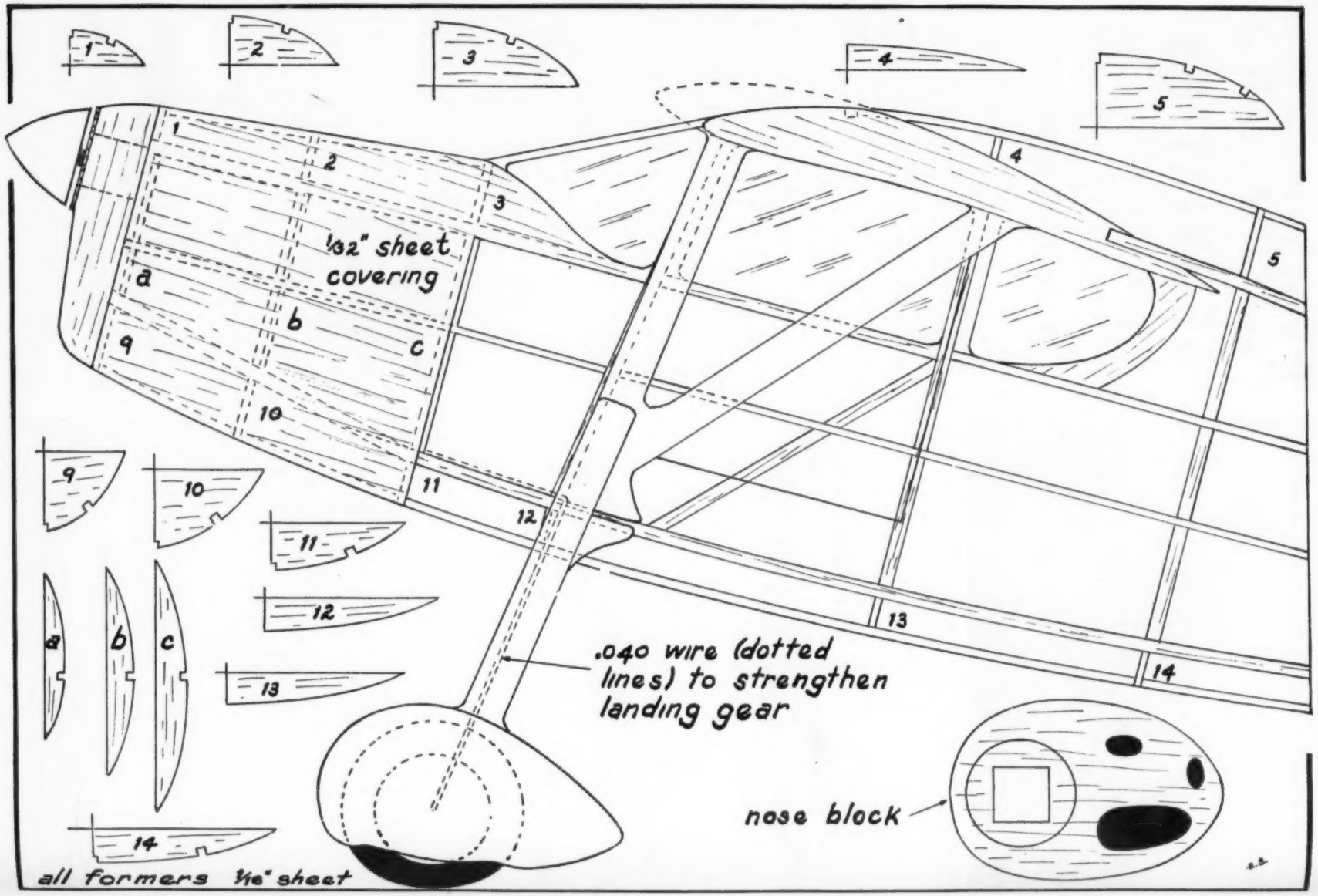
The new Blohm and Voss torpedo plane fighter


1
2
3
4
5
1/32" sheet covering
a
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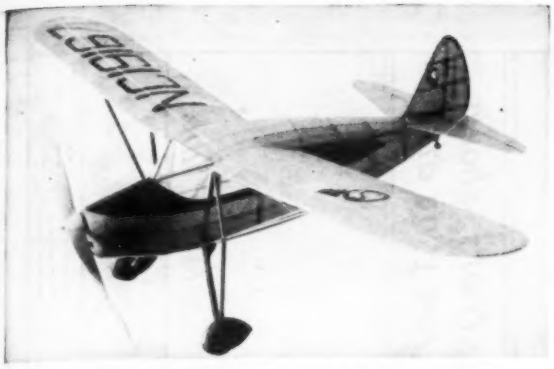
9
10
11
12
13
14
.040 wire (dotted lines) to strengthen landing gear
nose block
all formers 1/16" sheet



The most realistic flyer you will ever build

A large high pitch propeller insures long flights

A FLYING FAIRCHILD 24-K

A Flying Scale Model That Will Be a Joy To Build and Fly— Beautifully Designed, Strong and of Simple Construction

By EARL STAHL

THE new Fairchild "24K," through ingenious engineering, gives all the desired requisites of the private owner plane. Progressive designing over a period of seven years has developed a beautiful, easy to fly airplane with an excellent performance. Powered by the new 165 horsepower Ranger in-line engine, this model features unusual payload and performance characteristics with ample room and comfort for four persons.

Fairchild airplanes have long been noted for their wonderful performance. With a full load of passengers, baggage and fuel, the "24" will cruise for 560 miles at 127 miles per hour. Landing flaps reduce the speed of landings to 47 miles per hour. The rate of climb at sea level is 730 feet per minute and the ceiling is 16,500 feet. Proof of the Fairchild's quality is the fact that the Civil Aeronautics Authority recently contracted for ten more "24's"—this brings to 33 the number they have purchased.

In the air it flies steadily with plenty of power and gives the appearance of a full-scale airplane

To demonstrate the reliability and stamina of the Ranger engine, one recently was run at full throttle, non-stop for 50 hours—equivalent in length of time for a Fairchild "24" to make a non-stop, refueling flight from San Francisco to Bombay, India, a distance of 6,750 miles. Features of this engine are extreme smoothness, economy of operation and minimum maintenance.

Model builders will find this plane's design excellent for a flying-scale model. Its aerodynamic set-up makes long, stable flights possible and the general nature of the design eliminates complicated structures. A well-built Fairchild model, if properly adjusted, will be capable of making flights of more than a minute, and whether on display or in flight its appearance is striking, indeed. Of interest is the fact that the model was developed directly from plans and data supplied by the Fairchild factory.

Construction is not difficult. Study the plan thoroughly and read the instructions before beginning actual work. Build directly over tracings of the plans; don't cut or spoil the pages of the magazine. Cement all joints firmly and make the structure accurate at all times.

Its fine proportions provide unusual stability

Fuselage

The fuselage is constructed in the conventional manner. Two 3/32" sq. side frames are built and then joined together, as indicated by the top view, to form the basic fuselage structure. As shown, a 3/32" rib is fitted into correct position as part of each side frame in order that the wing can be accurately attached in the final assembly. Halves of each of the formers are shown on the plan; they are all cut from 1/16" medium grade balsa. Cement them into place and attach the 1/16" sq. stringers. In the event notches aren't cut in the formers, the stringers are simply glued atop them. Side stringers are glued directly to the sides of the underframe.

The shaded area of the nose is covered with soft 1/32" sheet balsa. Use the widest stock available and glue the covering to the entire adjacent frame. If the curvature of the nose causes the sheeting to stand away from the formers, cut slivers from it to make the covering fit tightly. Plenty of pins and rubber bands will be needed to hold the covering in place until dry. The nose block is cut from a piece of medium grade balsa; and once it is glued into place its shape is sandpapered to make it blend with the sheet covered nose.

Landing gear legs are attached to the fuselage before it is covered. A continuous piece of .040 music wire is bent to fit to both bottom longerons of the fuselage, as shown by dotted lines, and then extend down the struts to form axles for the wheels. Neatly bind the wire to the longerons with thread. The landing struts are cut to shape from extremely hard 1/8" sheet balsa or even white pine. All struts are streamline in cross-section; a groove on the inside of the legs concealing the wire, and thread and glue will hold the struts to

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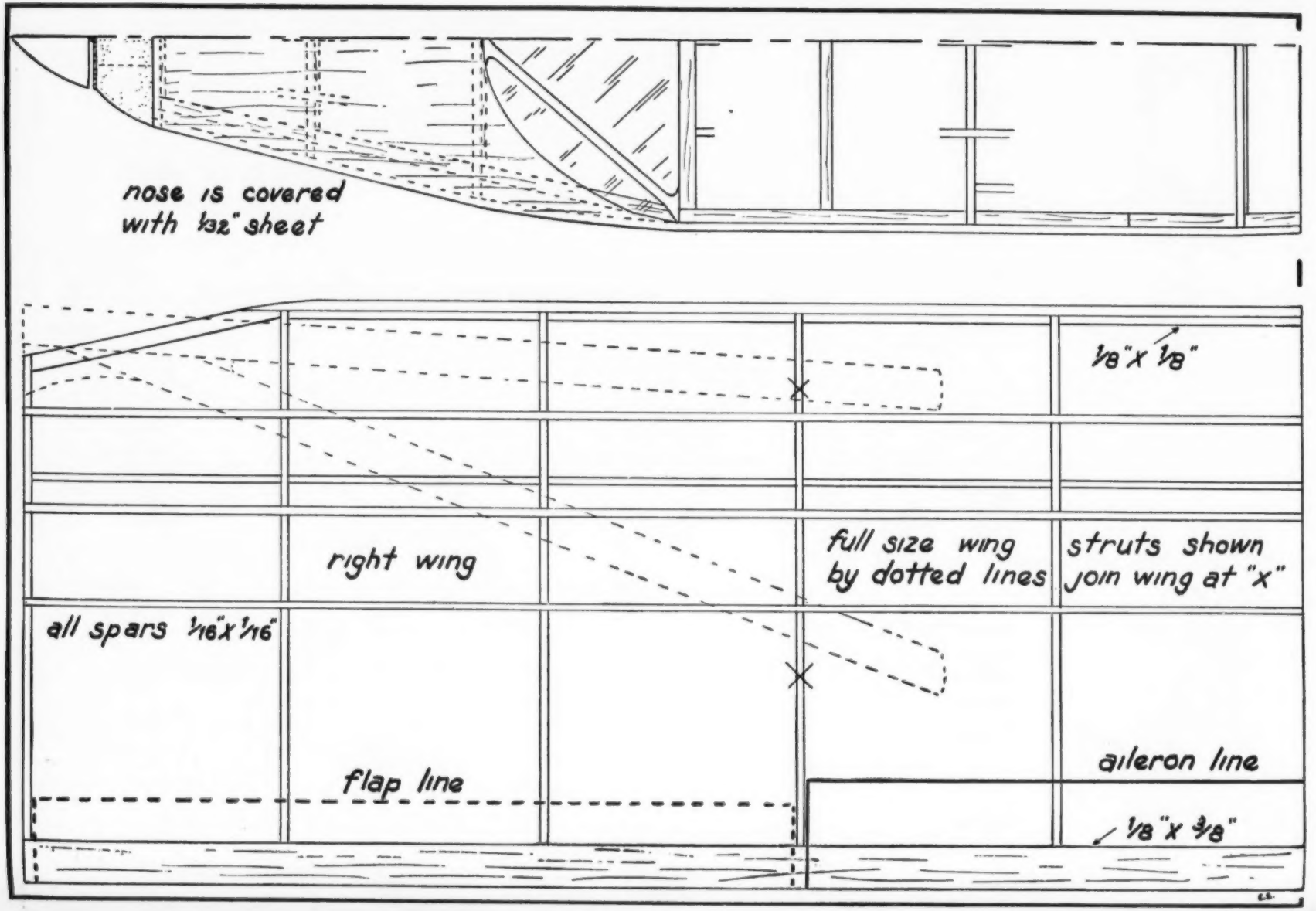
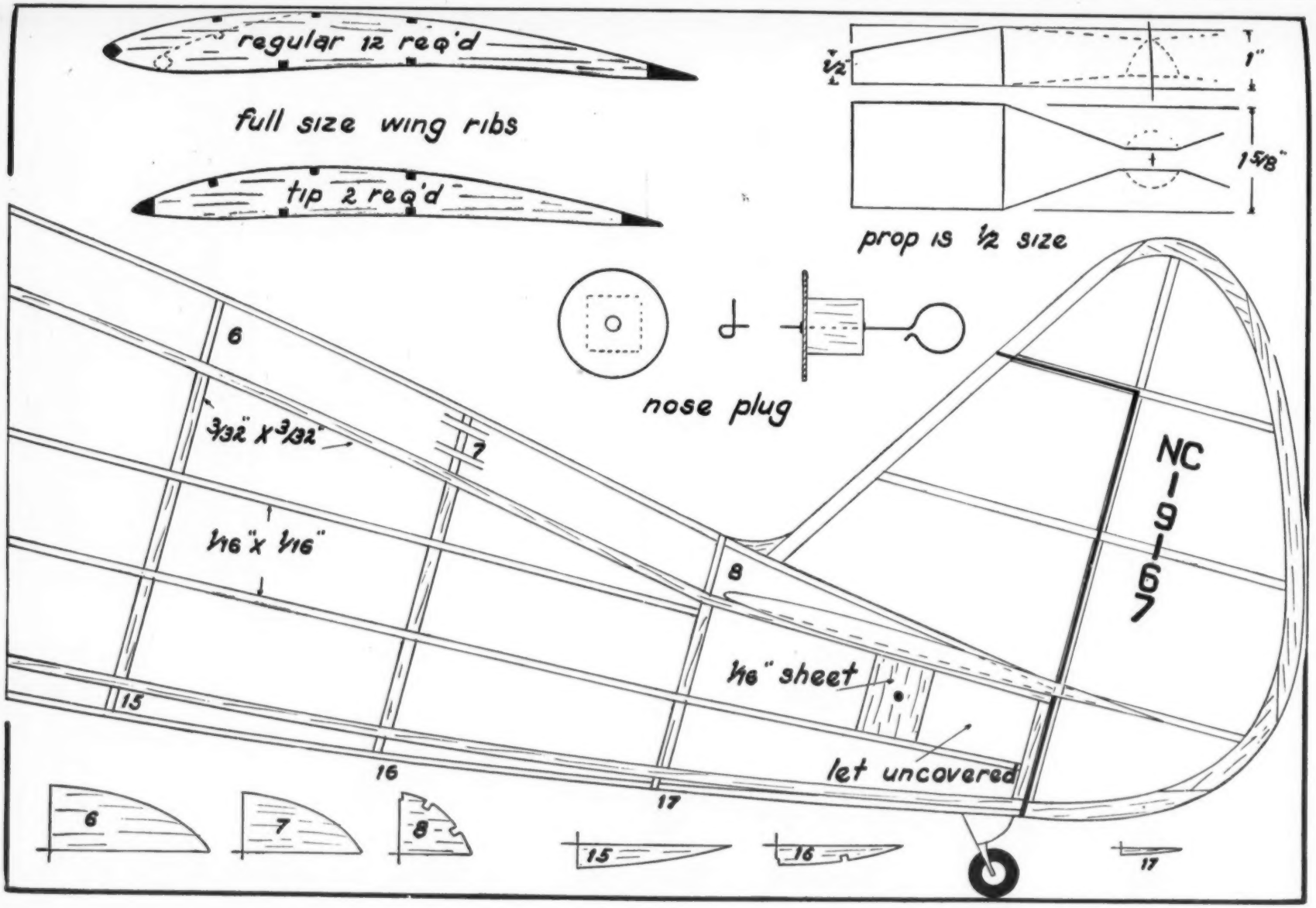

nose is covered
with 1/32" sheet
1/8"x 1/8"
right wing
full size wing
by dotted lines
struts shown
join wing at "x"
all spars 1/16"x 1/16"
flap line
aileron line
1/8"x 3/8"


regular 12 req'd
full size wing ribs
tip 2 req'd
1/2"
1"
1 5/8"
prop is 1/2 size
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3/32" x 3/32"
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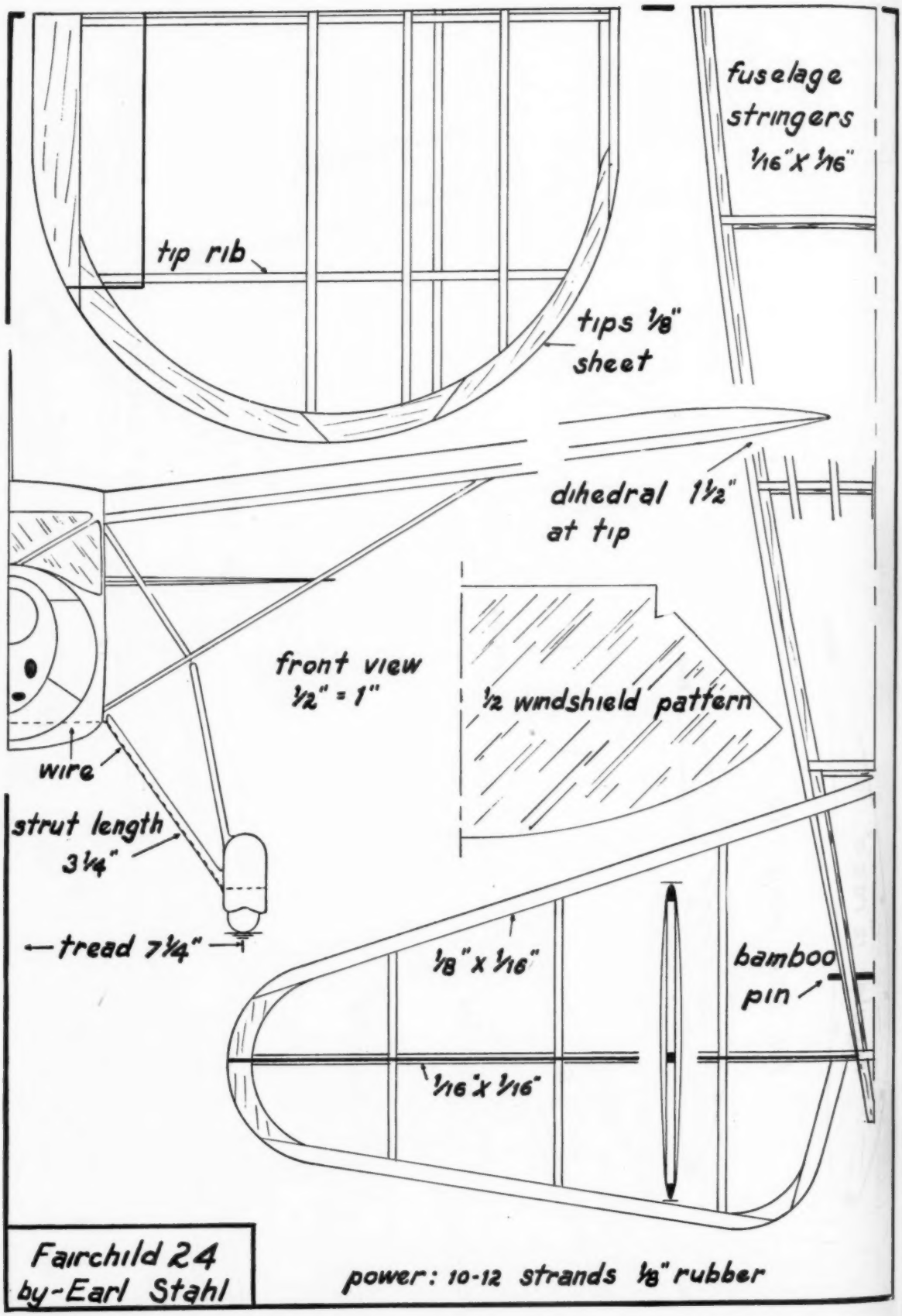
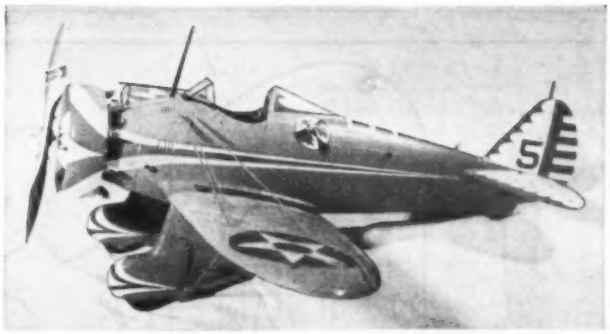


Fairchild 24
by-Earl Stahl

power: 10-12 strands 1/8" rubber

Air Ways

What Air Ways Club Members Throughout the World Are Doing to Increase Their Knowledge of Aviation



Picture No. 1. What could be sweeter than having this model Boeing P26-A repose on one's mantel piece? It was built by Peter Zaleski

Picture No. 2. A beautifully constructed Vought Corsair built by Grace Beckwith—Look Out Boys!!

RUBBER powered models still hold an advantage over gas powered ships in many respects. They can be built on the living room table and their motors can be given a test run without complaints from the neighbors being recorded against you at the police department. Keen observers also will note that there are fewer gasoline and oil spots on the bedroom floor.

After all, this is a much cheaper and easier way to experiment in aerodynamics than to struggle with the complications of gas motor installations and operation, as well as the more intricate structures of gas models. Three of four rubber test models can be built, flown and the data obtained in the same space of time that would be required to go through this procedure with gas models. True, rubber models do not have the glamour of gas models, and "rubber powered" builders usually carry on their work in comparative obscurity.

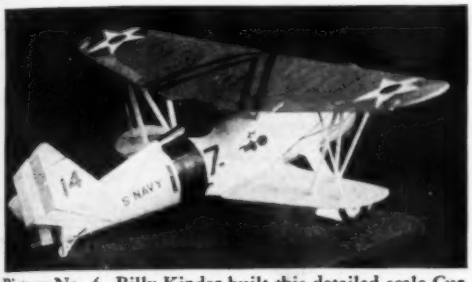
This phase, nevertheless, is interesting and does not detract from the craftsmanship displayed in solid scale and rubber powered ships. For instance, look at picture No. 1. Here is shown a carefully built scale model of the Boeing P26-A. It required 1000 hours to construct and is more than a mere solid scale model; for it is covered with aluminum foil 5/10,000" thick. All the controls, including the tail unit, are movable from the cockpit; the door is mounted on hinges and the motor is built up of many small pieces, copied from actual factory photographs.

This little ship took first place in the Scripps-Howard Nationals at Akron in 1938. Its talented builder is Peter Zaleski of 3516 E. 74 Street, Akron, Ohio.

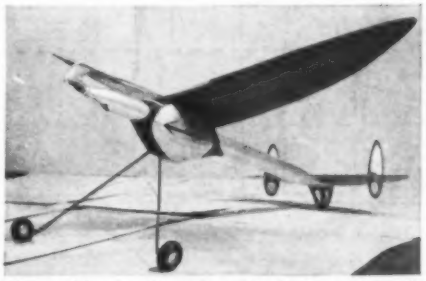
It appears that the boys are running into a little competition from the "fair sex"; for picture No. 2 shows a Vought Corsair built by Grace Lucille Beckwith of 1321 Fort Drive NW, Brightwood, D.C. Though it was made from a kit, it has been beautifully constructed and the front part of the fuselage is formed with inlaid balsa. The rest of the model is covered with tissue. A paint brush and razor-blade in the hands of a craftsman is responsible for this fine piece of work.

Ed Sengwoda of 1940 Macdonald Avenue, Brandon, Man., Canada, sends us picture No. 3, showing his pod-fuselage contest job. He says that this is the second of what he believes is going to be a long line of models based on the pod-fuselage idea. It has proved its aerodynamic advantage in a number of ways, and each flight makes him cherish the idea more. Mr. Sengwoda has been experimenting with this type of plane

(Continued on page 56)

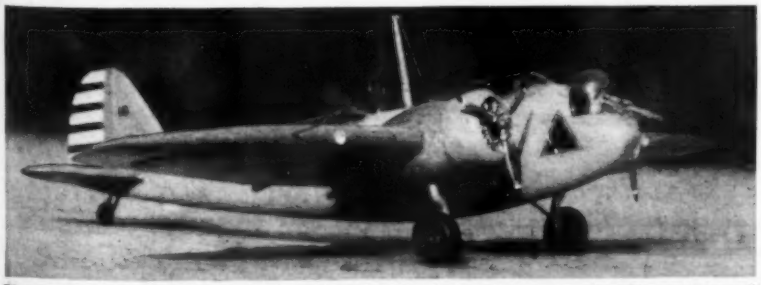


Picture No. 4. Billy Kinder built this detailed scale Curtiss Hawk F-11C-4 in 108 hours. It is beautifully done

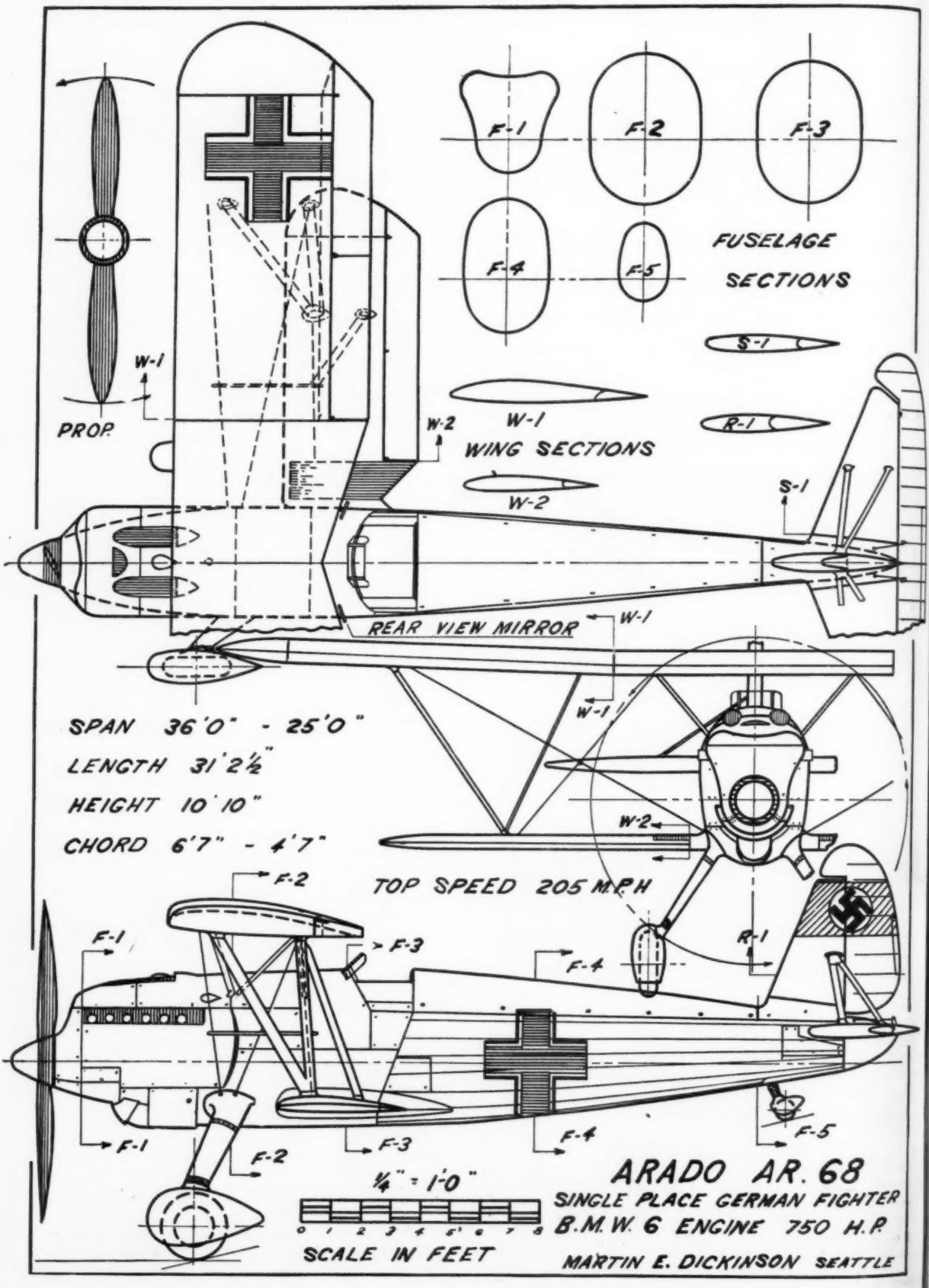


Picture No. 3. Here is a simple type of fuselage that conforms to contest requirements

Picture No. 5. An exact scale rubber powered Rearwin large enough to mount a gas engine. Why not combination models?



Picture No. 6. A carefully detailed model of a Martin Bomber, by Carl and Tony Riccardi


F-1
F-2
F-3
F-4
F-5
FUSELAGE SECTIONS
S-1
R-1
W-1
W-2
WING SECTIONS
PROP.
REAR VIEW MIRROR
SPAN 36'0" - 25'0"
LENGTH 31'2½"
HEIGHT 10'10"
CHORD 6'7" - 4'7"
TOP SPEED 205 M.P.H
¼" = 1'-0"
0 1 2 3 4 5 6 7 8
SCALE IN FEET
ARADO AR. 68
SINGLE PLACE GERMAN FIGHTER
B.M.W. 6 ENGINE 750 H.P.
MARTIN E. DICKINSON SEATTLE

Gas Lines

(Continued from page 19)

old 1939 rules, and we believe rightly so.

Many model builders have been interested in seeing a rule developed which would specify a definite wing loading and also be based upon power loading. Such a rule would be represented by a straight diagonal line from the lower left-hand corner of the graph, running across the face of the graph upward to the right.

On the graph there are lines representing three examples of this rule: each line representing a different power loading. The lower line represents a power loading of 45 oz. per c.i.p.d. Any point on this line must have this power loading. In the column at the left is shown the amount of area such a plane would have. The weight of such a plane may be determined by means of the column at the right.

For instance, if there was a rule which specified that every plane should have a wing loading of 8 oz. and should have a minimum weight of 45 oz. per cu. in. of piston displacement, and we powered that particular plane with an engine of 1.1 c.i.p.d., we see from the graph that this 1.1 vertical line intersects the 45 oz. p.d. line on a horizontal line which runs from 50 oz. on the right to 900 sq. in. on the left. In other words, the plane could weigh not less than 50 oz. and FOR THIS WEIGHT could not have more than 900 sq. in. of wing area. Of course, if you wished to put this engine in a plane weighing more you might do so.

For instance: a plane might weigh 80 oz. Such a plane would be represented by a point at the intersection of the vertical line from 1.1 and the horizontal line at 80 oz. Following the 80 oz. dotted line across the graph, we see that this plane could not have more than 1440 sq. in. of wing area.

If you will work out a number of the lightest and most highly powered planes you know, by location on the graph, you will see that nearly every one of them will lie on or above the 45 oz. c.i.p.d. line. In other words, this diagonal line represents the least practical limit of weight for a given amount of power that any airplane may be built to, with a minimum wing loading of 80 oz. per sq. ft.

If there was a power loading rule which specified the minimum power loading of 45 oz. c.i.p.d., then any airplane could be built which is represented by a point on or above this amount on the graph.

In the opinion of many people, the planes which were being built during the past year had too little power loading to conform completely to safety requirements. Also these planes were, in many respects, similar to helicopters; which climbed because of the power of the engine relative to the weight of the plane

How much horse power did you say that motor had? (Before the "one hand" rule was changed.)

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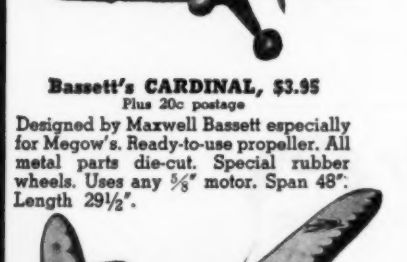

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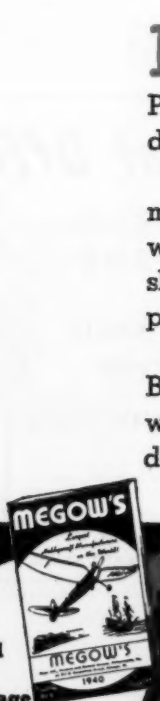

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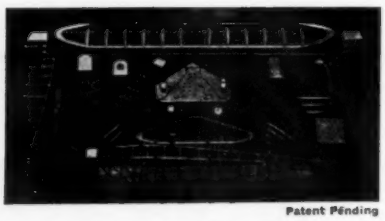

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and not always because of aerodynamic efficiency. Nevertheless these ships enhanced the element of sport considerably and were indeed spectacular.

In order to minimize the danger element and encourage young men to give more thought to obtaining endurance through aerodynamic design rather than through light power loadings, the Academy of Model Aeronautics, at its recent meeting, voted upon and passed the rule that all gas models must weigh 80 oz. or more per cu. in. of piston displacement, and that any plane must weigh 8 oz. or more per sq. ft. of wing area. This rule requires that all planes with an engine of 0.6 c.i.p.d. must weigh 48 oz. or more. The wing area is dependent upon how much the plane will weigh. It may weigh 80 oz. if so desired.

In other words, under this new ruling the minimum weight of any plane must be proportional to the piston displacement. This puts all planes, regardless of the engines used, on the same power-weight basis as indicated by piston displacement and should therefore allow the same potential for duration for all sizes of planes that come under this ruling, other conditions being the same. Any planes above this line may be built under this ruling. Thus a wide range of sizes and types may be built. These rules include many planes that were not allowed by the old 1939 rules. It eliminates from contests the planes which are represented by points between the 80 oz. line and the bottom of the table. Inasmuch as it is nearly impossible to build a plane below the 45 oz. line, those which are actually eliminated are those which lie between the 80 and 45 oz. diagonal lines.

Some delegates at the conference felt that this was too much of a limitation to start with, and that it would have been wiser to choose a minimum power loading of 60 oz. This minimum loading is represented on the graph by the middle diagonal line. They believed that a slight restriction to start with might be more acceptable and give eventual better results than the more radical change which was brought about by the 80 oz. per cu. in. of piston displacement rule. Nevertheless it is believed by many model builders and experts in the field that the important point is that there is a power loading rule, regardless of what this specified power loading may be.

Perhaps the reader may have another rule which he believes would be superior. By means of this graph he may work it out and indicate on the graph exactly what his rule will mean in respect to the three factors involved—weight, area and power.

Though rules are important, the fellows who are particularly interested in building planes must not be forgotten. Unquestionably they wish to see what other well-informed gas model fans are creating.

In picture No. 1 we have a very dramatic view of Fred Kulick's tailless plane, flying at the Quaker City meet last fall. When properly adjusted this little ship is as steady in flight as any gas model with a tail. Kulick lives in Paterson and is a member of the East Paterson Gas Club.

Many builders have taken to gull wings. A fine streamline example of this type of model is shown in picture No. 2, with its builder—Bruce Donlan of 413 West 103 Street, Chicago, Illinois. Donlan says this model was primarily an experiment. The fuselage was made from a solid block of balsa which was turned down and hollowed out. The wings and tail assembly are planked and the whole ship has been covered with silk and sprayed with dope. The ship is exceedingly strong for its weight; which is only twenty-five ounces with an Ohlsson "23." This is truly remarkable and speaks very highly of Donlan's design and craftsmanship. Thirty-two flights have been made in the past three weeks, during which time two contests were entered. The average length of the flights is one to two minutes. Donlan not only deserves a place of honor for this ship, but also for the fact that he has been a reader of MODEL AIRPLANE NEWS for nearly eleven years. The first copy he purchased was the second issue ever published.

Picture No. 3 shows another excellent gull-wing ship. This plane is original inasmuch as it was developed from a series of rubber models. It has a span of 60 inches, a wing area of 358 square inches and weighs about 20-1/2 ounces. The unique part of this ship is the "V" stabilizer. As you will note, the stabilizer acts as both stabilizer and fin: the customary vertical fin being eliminated entirely. As yet the ship has not been test-flown, but its builder, Donald Coles of 1807 Hague Avenue, St. Paul, Minn., believes he will experience no trouble inasmuch as rubber powered models of this type have been excellent fliers.

Picture No. 4 shows Mr. Rey Arden, designer of the "Mighty Atom" motor, starting up his little engine in the plane which captured first place in the Class A event at Creedmore, New York, recently.

Most gas model builders know that it is exceedingly difficult to build a gas powered biplane that will perform in a satisfactory manner. Ray A. Minott of 617 6th Street, Ames, Iowa, built the plane shown in picture No. 5. It has more than lived up to his expectations and has made some remarkable flights. He says:

"It is built to exact scale and is powered with an Ohlsson "23." It has a 10.7 oz. wing loading. On its first flight, I gave the motor about one-third throttle, and hand-launched it into the wind. It made a turn to the left and circled like so many gas jobs do when they are winding in. However instead of the proverbial crash, it took out into a vertical bank and for about twenty seconds it gained altitude. When the motor cut it glided down with the only damage a broken set of motor mounts.

"Since its first flight I have lengthened the body 3" and equipped it with retractable landing gears. An Austin timer trips a lever after 7 sec. and the wheels snap up into position like a mouse-trap going off; in fact that is where I got the idea. The plane lands on a balsa skid on the belly of the ship.

"It is the most stable and realistic ship I have ever seen fly, and I would be glad to write to any one wishing 'info'.

"During the last summer I won 5 firsts in nine contests, taking first in every Class

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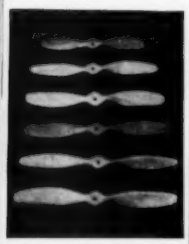

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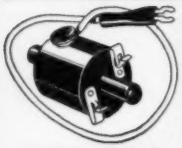

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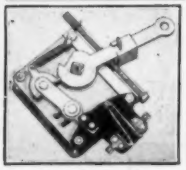

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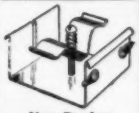

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LOOK camera man caught the Scientific "MERCURY" in action and printed this picture in Dec. 5, 1939 issue.

THE MERCURY

When a leading picture magazine sends a special camera man out to photograph the SCIENTIFIC "MERCURY" in flight, there must be something unusual to make this model such important news. Look Magazine did that and the reason is simple . . . SCIENTIFIC "MERCURY" is so outstanding in both appearance and performance that she is really in a class by herself. A number of transport aviators have said that here is a model that acts and performs like the real big ships they fly. Our engineers have incorporated a balance that eliminates imperfection but insures straight and fast flying. The slow roll after the motor cuts brings her out on top as she starts her long, fast glide to earth, making it appear that she is actually being handled by a human hand. These features are a few that make the SCIENTIFIC "MERCURY" outstandingly satisfactory in every detail. It has staggered tail surfaces, as protection against spinning; a tapered wing, for greater flying efficiency and a reinforced front end for the nose to successfully enable this gas model to withstand severe motor vibration and the impact of landing. Full size illustrated plan of the "MERCURY" makes her easy to build. Wingspan 6 ft., over-all length 52". Weight complete with motor and ignition units 2¾ lbs. The kit is complete with all necessary materials including a pair of 3½ in. streamline balsa wheels and a full size plan with complete directions. Go to your dealer today to see this Scientifically designed airplane. Priced at..... **$4.95** less motor

Gas Type Winners!

"The Flea"

Wingspan 36"—length 28"—weighs 3 oz. Kit contains everything; including M & M wheels, dummy gas engine, postpaid **$1.95**

"Firefly"

WINGSPAN 36"—LENGTH 28"—FLIES 1 MILE. Looks and sounds like a real gas job. Kit 100% complete including M & M pneumatic wheels. Postpaid **$1.95**

"Miss America"

40" WINGSPAN—LENGTH 27½"—FLIES 1 MILE. An easy model for the beginner. Kit 100% complete including M&M wheels, postpaid **$1.95**

"Valkyrie"

WINGSPAN 24 inches—LENGTH 15 inches—WEIGHT 1¼ oz. Formerly sold for $1.00. Complete with full size plan and many finished parts. Postpaid..... **50c**

2 New 194

Dick Korda's VICTORY

Wingspan 32". Length 23". Fly her to victory in your next contest.

ONLY 50¢ EACH AT YOUR DEALER OR POSTPAID

At last! Korda models as only Sci... model airplane kits, can bring th... .models DESIGNED TO FLY by t... the Wakefield trophies, the two ... accompanying pictures tell bette... employed in these good looking ... selected balsa, and the clear ... numerous photographs and explic... ability of this champion model ... Gold Star will be the flyingest ...

Test flights have proven that th... everywhere like to construct, for ... graceful spirals consistently ... frequently coming down for a ...

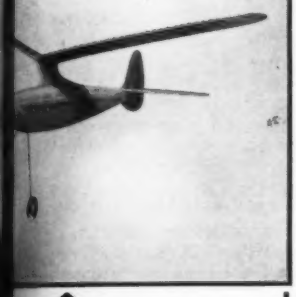
You beginners get off to the rig... models. Whichever one you ... ask for a better flying model. ... so use them in your next meet.

KIT INCLUDES: Formed win... selected balsa, and many other ...

SEE YOUR DEA... SCIENTIFIC M... 218-220 MA-1 M...

nsations
by WORLD'S CHAMPION

Dick Korda



ick Korda's
GOLD STAR

pan 32". Length 22½".
ll as she takes her place
sky.

only Sci leading manufacturer of quality
bring th wonderful new rubber powered
LY by th has won both the Moffatt and
he two l ard in model competition. The
ll better remarkably simple construction
looking The usual Scientific high grade
clear full size plan complete with
nd explo bined with the great designing
model l arantee that the Victory and the
ingest S over built.

that the of airplanes that model builders
ruct, fo off the ground, climbing in fast
ntly turn over a minute and a half, and
for a lo rn the starting point.

the right building by making these Korda
you bu re that even an expert couldn't
odel. It to N.A.A. contest specifications
t meet.

d wire full size illustrated plan, carefully
other ki d only in Scientific Kits.

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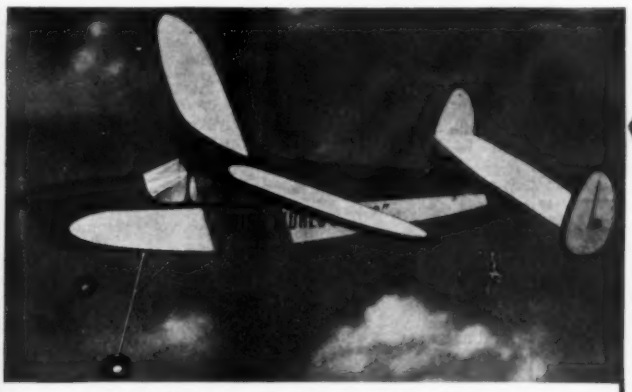
C M AIRPLANE CO.
MA , NEWARK, N. J.



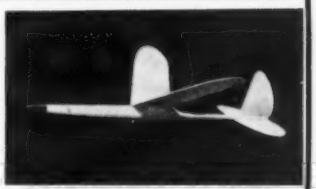
MISS WORLD'S FAIR—30" Wingspan

The New York World's Fair has closed its gates until next spring . . . but there is no interruption in the popularity of SCIENTIFIC "MISS WORLD'S FAIR." It is speedy two ways. First, you can build it in a jiffy and, secondly, she will quickly climb and make at least a half mile before alighting to a perfect 3 pt. landing. Wingspan 30"—length 20". Kit furnished complete with full size plan, selected parts and accessories. At your dealer or direct, 50c postpaid.

50" MISS WORLD'S FAIR. Your thrills and enjoyment will be multiplied in building this sister ship that flies at least one mile. Has 50" wingspan, length 35½" . . . and talk about your prize winners, enter her in your next outdoor contest and you will walk in with top honors. At your dealer's or postpaid **$1.50**

THE ORIOLE

50" wingspan; over-all length 34". It conforms with the N.A.A. contest requirements and boasts of many cups won from Maine to California. Postpaid direct.... **$1 POSTPAID**

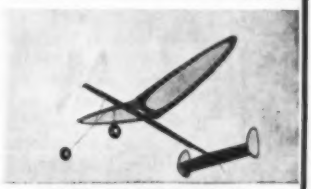


SCIENTIFIC GLIDER

Boasts of record flight of over one hour. Wingspan 20⅝", length 18". SCIENTIFICALLY streamlined to combine beauty with performance. Build it in a jiffy and get the thrill of a lifetime. Complete with full size plans and instructions. ..... **25c** Postpaid

FLYING YANKEE

Wind her up fully and set her on the ground—let her go—and watch her race along for 2-3-4 feet, her tail lifts, and the wheels leave the ground with the grace and stability of a transport. The model noses up steeply and climbs at an amazingly high rate of speed. Upon reaching its ceiling of 200 feet it levels off, flies in 50 foot circles, and then power shuts off, and it goes into the neatest flat glide you ever did see, coming in for a three point landing. See your dealer now and build a "Flying Yankee" ..... **25c** Postpaid



THE FLEETWING

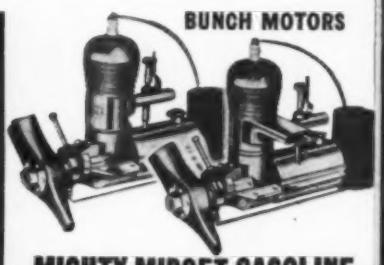
The "Fleetwing" is the year's outstanding record breaker. The simplified Scientific method of construction makes this model the easiest of all flying models to build. Wind motor fully until a row of knots form; set model on runway and she's off like a bullet after only a 3 foot run. She's heading straight up and climbing at the amazing rate of 600 feet per minute—at a height of 250 feet the model levels off and cruises for 1,000, 2000, 3,000, and often even 5,000 feet..... **50c** Postpaid

JITTERBUG

Contest model. Length 20½". Flies over 1 mile. Has detachable wings. Classy cabin. See all its many features at your dealer..... **50c** Postpaid

Sky Chief

$6.95 P.P.



BUNCH MOTORS

MIGHTY MIDGET GASOLINE ENGINES Only $9.50

MIGHTY-MIDGET Upright Kit $7.85. MIGHTY-MIDGET Inverted Assembled $9.75. MIGHTY-MIDGET Inverted Kit $7.85. GWIN-AERO Upright Assembled $12.00. GWIN-AERO Upright Kit $9.85. GWIN-AERO Inverted Assembled $12.50. GWIN-AERO Inverted Kit $9.85. MIGHTY MARINE Assembled $12.50. MIGHTY MARINE $10.85.

The Ohlsson "23"

Chock full of Speed and Power. 1/7 h. p. ⅝ bore x ⅝ stroke.

$16.50 p.p. Complete

Ohlsson Gold Seal 1/5 h.p. ..... **$18.50 p.p.**

DENNYMITE

DELUXE AIRSTREAM Complete with coil, condenser, Dural motor mounts. ..... Postpaid **$17.85**

STD. AIRSTREAM Complete with coil, condenser ..... postpaid **$15.85**

AIR STREAM UNIT Same as Standard Airstream less coil and condenser. ..... postpaid **$13.85**

WE ALSO STOCK

Syncro Bee $12.50 Postpaid

Pee Wee $10.00 Postpaid

Musky $12.50 Postpaid

Syncro Ace Special $9.95 Postpaid

Syncro Ace $13.75 Postpaid

Trojan $10.00 Postpaid

ATOM

Bore ¼"
Stroke ¼"
Weight 2 oz.
17,500 RPM

$12.50 Complete Postpaid

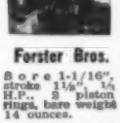
HI-SPEED MOTORS

BULLET $12.75 POSTPAID

TORPEDO $16.50 POST PAID

M&M $16.50 Post Paid

BRAT MOTOR $11.50 Postpaid



BROWN JR.

Model D— $12.50
Model B— $21.50
Model C— $18.50
Model M— $16.50
All Postpaid

Forster Bros.

Bore 1-1/16", stroke 1⅛", ½ H.P., 2 piston rings, bare weight 14 ounces.

Model "B", Air cooled. With bronse main bearing $17.75

Same as above but with Precision Aircraft Ball Bearing Main Bearing $19.50

WANTED:
RED-BLOODED ADVENTURERS

Listen to
"SKY BLAZERS"
—true adventures of the Men and Women Born to Blaze the Trails of the Blue
Thrilling! True! Romantic!
EVERY SATURDAY Over
COLUMBIA BROADCASTING SYSTEM
7:30 P.M. E.S.T.—6:30 P.M. C.S.T.
7:00 P.M. M.S.T.—4:30 P.M. P.S.T.
PRESENTED BY WONDER BREAD

$15 FULL CASH PRICE
Preliminary **AIRCRAFT DRAFTING**
Take your first step toward a career as airplane draftsman, designer, engineer with this home study course by eminent aeronautical engineers. Eighth grade arithmetic only math required. Your work judged and graded by authorities in the industry. Send check or money order; satisfaction upon inspection or your money back.
WESTWOOD *Correspondence School*
902 Village Station, Los Angeles, Calif.

IMPERIAL GAS AND RUBBER-POWERED SUPPLIES.
FREE 60 1/16x1/16x18 Balsa, 1 bottle Cement, and 1 pair 2" wheels with orders of $1.00 or more for supplies only.

18" BALSA
1/16x1/16 100, 5c
1/16x⅛ 35 for 5c
1/16x3/16 18, 5c
1/16x¼ 15 for 5c
3/32x3/32 30, 5c
⅛x⅛ 30 for 5c
⅛x3/16 12 for 5c
⅛x¼ 10 for 5c
3/16x3/16 8, 5c
¼x¼ 6 for 5c
¼x⅜ 6 for 10c
⅜x1/16 5 for 5c
⅜x⅜ each, 2c
⅜x½ 2 for 5c
1/64x2 4 for 10c
1/32x2 8 for 10c
1/16x2 8 for 10c
3/32x2 7 for 10c
⅛x2 6 for 10c
¼x2 3 for 10c
3" sheets or 36" lengths, double above prices; 8 foot Balsa, triple 18" prices. Add 10c packing charge on 36" lengths—20c on 5' lengths.

SHEETS 12"x2"
1/32 10 for 10c
1/16 10 for 10c
⅛ 8 for 10c
3/32 8 for 10c
¼ 3 for 7c

18" PLANKS
1x1 5c; ½x2 6c
1x1½ 9c; 1x2 10c
1x3 15c; 2x2 18c
2x3 23c; 2x6 39c
3x3 40c; 3x6 75c

WIRE
6-8-10-12-14
2 ft. 1c
1/16 dia. 5 ft. 12c
.050 3 ft. 5c
3/32 dia. 5 ft. 15c
⅛ dia. 5 ft. 25c

COLORED DOPE
6c per oz.; Large bot. 10c; ¼ pt. 35c

PROP SHAFTS
REAR HOOKS
12 for 8c

WHEELS per pr.

	Birch	Balsa	Celu
¼	.01	.03	
⅜	.02	.04	.05
1	.03	.05	.07
1⅜	.04	.08	.10
1⅝	.07	.10	.16
3	.15	.15	.30

CLEARCEMENT
5c per oz.; large bottle, 8c; ½ pt. 35c; 1 pt. 55c

CLEAR DOPE OR THINNER
5c per oz.; Large bottle, 8c; ½ pt. 30c; 1 pt. 45c

PROPELLERS

	Balsa	Paul-O-Mach. Cut	Wing
5"	4c	10c	
6"	5c	15c	
7"	6c	20c	
8"	7c	25c	
9"	8c	30c	
10"	8c	35c	
12"	10c	45c	
14"	14c		
15"	15c	55c	

RUBBER
.045 .....25 ft. 5c
1/16 sq. ..15 ft. 5c
¼ flat.....15 ft. 5c
Skein 55c
3/16 ..... 10 ft. 5c

THRUST BEARINGS, dz.
Sm. 10c; lge. 15c

REED
1/32-1/16 2 for 1c
3/32 or ⅛ 1 ft. 1c

CAMEL'S HAIR BRUSHES
Small 3c; Lge. 5c
Extra large..... 8c
Flat, large 10c

ALUM. TUBING
1/16,3/32,⅛,ft.7c
3/16, ¼, ft. 10c
5/16 ft.....15c

INSIGNIA
24 and stripes 5c

FREE POSTAGE on all U.S. orders east of Miss. for 50c or over. West of Miss. or under 50c, add 10c postage. Canada, U. S. possessions, and foreign, over $1.00 add 15%. For-eign, under $1.00, add 15c. No C.O.D. No stamps.

PROP BLOCKS
⅛x¾x6 6—5c
⅝x1x8 3—5c
⅝x1¼x10 3c ea.
⅝x1½x12 3c ea.
1x1½x12 4c ea.
1x1½x15 7c ea.

SHEET ALUM.
.0004x5x11½
2 sheets.....2c
.005 in.....6x6...5c
.010 in.....6x6...6c
1/32.....6x6.....15c
1/16.....6x6.....30c

TISSUE, AA
All col., doz. 19c
Silver .....ea. 5c
Superfine, wh. 5c

BUSHINGS
1/16.....4 for 1c

WASHERS
1 doz. ⅛ or ¼ 1c

CELLULOID
6x8.....5c
12¼x16.....19c

NOSE PLUGS
½".....12 for 8c

15" BAMBOO
1/16x¼ 6 for 5c
Shredded, 36—5c

SPONGE RUBBER WHEELS
pair 1".....15c
1¼".....18c

COMPLETE 16-page CATALOG, 5c
Dealers: Confidential List on request on your letterhead.
IMPERIAL MODEL AERO SUPPLY
263 MAIN ST., Dept. 2-M, HACKENSACK, N. J.

B event I entered except the Nationals, in which I placed 7th. I have also placed from 2nd to 6th in the Open events of other contests."

Picture No. 6 shows another unusual gas job. It is an exact scale North American 0-47 observation plane built by Richart Stout of the North American Aviation company. It is complete in structural detail, which embodies a retractable landing gear and sliding hatches. Mr. F. W. Neidinger of 335 W. 27th Street, Los Angeles, Calif., who was kind enough to send us this information, says that "Best of all, it flies very well and is a good argument for mid-wing design."

The Wannalancit Model Airplane Club of Lowell, Mass., held a contest on October 8th at Lowell Airport. Picture No. 7 shows one of the planes being "tuned up" for a flight, with interested spectators watching the procedure. The club was fortunate enough to have Mr. Carl Goldberg attend the contest and he is shown at the right talking to the young man dressed in white. Carl ran off the gas event and was honorary director of the meet. Builders preparing the model for flight are Maurice Laliberte and Denise Lucier, both of Nashua, N.H. There were 55 contestants present and the meet was highly successful.

James Klug of 43-48 Burling Street, Flushing, New York, sends us picture No. 8, which shows a view of the planes of the Model Aircraft Club of Long Island at a contest they held recently. The large Lockheed Vega gas job was built by Alfred Young, president of the club, and has a wing span of 82 inches. In spite of the unusual and scale design it turned out to be a fine flier. The model to the right of the Vega belongs to Charles Fortmor, the club's vice-president, shown in the right of the picture.

Charles H. Siegfried of 1034 Porter Avenue, Wichita, Kansas, winner of the Berryloid Event of the 1939 Nationals, sends us picture No. 9. Mr. Siegfried is one of the leaders of the Wichita Gas Model Club, whose headquarters is the shop at the Municipal Airport, Wichita. The picture shows part of this busy place. The model with the dark lines along the leading edge, hanging from the ceiling, is the ship with which Mr. Siegfried won the Berryloid Event. This club is one of the most active in the country, though it consists of only 26 boys. Mr. Leo Rutledge, director, is shown in the center of the picture. Readers will recall he was one of the leading forces to bring about gas model activity in Kansas, and is state director of the IGMAA. At present Mr. Siegfried is working industriously on radio control models, of which he is an expert.

Picture No. 10 shows a display in the window of one of the leading department stores in Pittsburgh, Pa. This display is composed of the handiwork of a few of the many active members of the Model Wings Flying Club. This club boasts such prominent members as Dick Everett, Ed Fulmer, Jack Thames and Joe Boyle: all of whom distinguished themselves at the '39 Nationals. At present the club holds a lease to a plot of ground which gives them a flying field of considerable acreage. This field is located about three miles from the club's headquarters in Mt. Lebanon and six miles from Pittsburgh.

N.A.A. sanctioned contests have been and are being held every Sunday. Cash prizes as well as points are awarded the winners in the various classes. The club member having the most number of points at the close of the season will be awarded an all-expense-paid trip to the 1940 Nationals.

Motors Among the Missing

It is to be regretted that at this time it is necessary to issue a strong warning to all model builders, especially gas model flyers, to keep careful watch over their planes and equipment when competing, especially in big meets which attract a large number of spectators.

Theoretically, contest sponsors and managers should provide proper policing and supervision of contestants' pits and flying areas so that the possibility of planes, motors or tools being stolen be remote. However, it is human nature to relax guard just when it is most needed, so all model flyers are urged to be ever watchful and alert against those few thieving persons who seem to enjoy preying on aeromodelers.

Here is information on two such cases. Contest Directors and meet managers in the vicinity of both cases are requested to keep an "eye open" for the missing articles. At Union City, Conn., on Sept. 24 an Ohlsson "23" engine, No. 5723, was removed from a model owned by A. F. Johnson, of 11 Mildred Ave., Poughkeepsie, N.Y. Watch for the motor at meets, and also for an Ohlsson with number removed.

Alfred Hales, of 118 Maple Ave., Linderwold, N.J., lost a red and yellow Zipper near Watertown, N.J., with a Brown "D" motor No. 5D198. It is thought the ship and motor were recovered by someone who did not return the property to its owner.

New York

Henry Koninsky of 3525 Decatur Avenue, New York City, writes us of a very interesting experience, as follows:

"About four months ago some friends of mine were fortunate in achieving satisfactory results in flying a gas job indoors. This may sound a little fantastic but I'll explain. First of all the model was only about four feet in span. This was accomplished through the use of an Elf engine. The method of flight was to secure one wing tip to a pole with a string. Even under these circumstances flights were very fast and dangerous. If you would like some more information on these flights, I would be only to happy to oblige you."

Connecticut Liberalizes Gas Model Regulations; New Rules Patterned After N.A.A. Common-Sense Restrictions

Following a meeting with state model aviation leaders and a representative from the N.A.A. Model Division, Charles L. Morris, Connecticut Commissioner of Aeronautics, has just isued a new set of rules which are now a part of the State Laws governing the flying of model aircraft in that State.

SPEED-CHIEF

The ALL-ALUMINUM RACING CAR That Laps the Whole Field in Speed, Beauty and Price!

An Exact Scale Model With An ALL-ALUMINUM 1-PIECE BODY

Designed to Smash all Speed Records

Supercraft's engineers have achieved a new height in automotive mechanics—the SPEED CHIEF! It possesses a rear wheel drive with finger-tip clutch control and four-leaf springs on every wheel. The chassis is completely constructed of aluminum for combined strength and speed. SPEED CHIEF is a model maker's dream of sheer perfection in design, beauty and mechanical features. This year watch the SPEED CHIEFS go by—they're out in front and laps ahead in every detail!

- ★ Wheel Base 12½"—overall size 22½".
- ★ All aluminum castings designed for durability and to take plenty of shock.
- ★ Finger-tip clutch control engages or disengages the friction-type clutch at will.
- ★ Special built-in clutch lever enables motor of racer to be started by wheel friction or by fly-wheel.
- ★ Front and rear four-leaf springs—exact reproduction of a regular automobile.
- ★ Built with low center of gravity for top speed.
- ★ Front wheel steering.
- ★ Solid rubber tires, molded onto 3½" aluminum wheel.
- ★ All super speed long-life bearings throughout.
- ★ All drive shaft gears run-in and sealed in oil.
- ★ Rear wheel drive.
- ★ Ready for immediate construction with complete plans and all the necessary hardware.
- ★ Construction time—2 hours, 14 minutes.
- ★ Highly polished aluminum shell, exact scale model of championship racing car.

GUARANTEED AND DETAILED PLANS FOR EVERY PART

PRICE OF COMPLETE KIT
(less motor)

$12.50

LIST PRICE

BUILT FOR THE FAMOUS *Sky Chief* MOTOR
(OR ANY SIMILAR TYPE UNIT)

ONLY **$6.95** COMPLETE WITH COIL AND CONDENSER

MODEL MAKERS DO NOT ORDER DIRECT SEE YOUR DEALER . . . DEALERS ORDER FROM YOUR JOBBER.

AMERICAN Supercraft CORPORATION
UNION at LAKE STREETS — CHICAGO, ILLINOIS

BIG MONEY ASSEMBLING NEW PORTABLE FOR PADDLE—MOTOR—SAIL **BOAT** in a Few Hours

OK-2, the Outboard Ki-Yak Convertible to Sail or Rowboat

YOU can assemble Mead's amazing, portable KI-YAKS easily, inexpensively at home from our patented, numbered cut-to-fit construction KITS and save nearly HALF—or sell to others at big profits. Portable. Strong. Seaworthy. Thousands assembled from our KITS using EXCLUSIVE new construction principle. No experience needed. Just use simple hand tools. New 50-lb. and 75-lb. OUTBOARD KI-YAK KITS ready—use oars, sail, motor. Also 3 paddle-sail models from 20 to 45 lbs. (Double-blade paddle or Oars now *EXCLUDED* with your Kit.) Jet-setters! Write or send postcard for *FREE* lavishly-illustrated Circulars, low Factory-To-You Prices!

Write FOR BIG, LAVISHLY ILLUSTRATED Free CIRCULARS

MEAD GLIDERS
15 S. MARKET ST. Dept. K-20 CHICAGO, U.S.A.

BUILD & FLY
SELLEY-TEX MODELS
CONSTRUCTION SIMPLE AS A. B. C.

SELLEY-TEX AERONCA RACER
16" Wing Span **50c** *Postage 10c*

SELLEY-TEX REARWIN SPEEDSTER
75c *15c postage*
16" Wing Span *Send 5c for Catalog*

SELLEY-TEX BELLANCA RACER
20" Wing Span **$1.00** *15c Postage*

EVERY SELLEY-TEX CONSTRUCTION KIT CONTAINS
The necessary moulded fuselage sides, cowl, pants, bombs, motor, etc., sawcut propeller, scale propeller, scale propeller parts, formed wire hooks, scaled wheels, brass bushings, ribs printed out on balsa, turned wood parts, tail wheel fork fittings, wire, para rubber motor, colored paper, authentic markings, colored insignia, cement colored dopes and easy to understand plans, all are packed in a beautiful, sturdy box.

SELLEY-TEX CURTIS OSPREY
Wing Span 18¼" **$1.25** *15c Postage*

BUILD YOUR OWN GASOLINE MOTOR
All parts complete with spark plug coil and condenser. ½ HP. ¾ Bore..... **$5.00**
Very simple only a screw driver is necessary and 30 minutes and you have a motor ready to run for $5.00.

SELLEY MFG. CO., INC.
1377 GATES AVE., DEPT. 302, BROOKLYN, N. Y.

Since there are few good flying sites in the "Nutmeg" state outside of regular or emergency airports, Connecticut gasoleers have accepted the new rules with enthusiasm.

Along with N.A.A. Contest Directors, Al Lewis attended the session which preceded the final announcement of the new rules. Lewis flew up to the meeting with Bill Strohmeyer of the N.A.A.'s Private Flying Division and on the way was able to make an aerial tour of the State which led Lewis to agree with the Connecticut aeromodeling leaders that outside of airports, there were few available gas sites in the state.

The new rules follow:

Connecticut Regulations Governing the Flying of Aircraft Models

In accordance with the provisions of Section 1064E of the 1939 Cumulative Supplement, General Statutes of Connecticut, the following regulations are hereby in effect governing the flying of aircraft models:

1. RUBBER BANDS. Aircraft models, if powered by rubber bands, are exempt from these regulations.

2. AGE LIMIT. No person less than 14 years of age shall fly, or cause to be flown, any free-flying aircraft model powered by other than rubber bands.

3. SIZE LIMIT. No person shall fly, or cause to be flown, any free-flying aircraft model powered by other than rubber bands, if such model weighs more than *seven pounds*, nor if it has a wing-loading of less than eight ounces per square foot.

4. LIMIT OF FLIGHT. A suitable automatic timer, set for a *maximum engine run of not to exceed 30 seconds* shall be installed on all free-flying aircraft models, other than those powered by rubber bands.

5. RADIO CONTROLS. If *radio control* is installed in any model, sufficient to control the aircraft at all possible distances from the transmitter, the restrictions in Sections 3 and 4 may be disregarded, provided, however, that the maximum gross weight does not exceed *25 pounds*.

6. SITES. No free-flying aircraft model, other than those powered by rubber bands, shall be flown *within 2 miles of any airport* (except as provided in Section 7). No such model shall take off from a point closer than *600 feet from any building or highway*.

7. AIRPORT FLIGHTS. Model aircraft may be flown from an airport provided that—

a. Permission in writing shall be secured from the Airport Manager or his authorized representative;

b. All full-scale aircraft flights originating on the airport shall be suspended;

c. No model shall be released for flight when any full-scale aircraft is in the vicinity of the airport;

d. The automatic timer on the model shall be set for a maximum engine run of not to exceed 15 seconds;

e. An area of approximately 500 feet square shall be set aside by the airport manager or his authorized representative, and shall be marked by suitable warning flags spaced not more than 75 feet apart;

f. Said area shall be in a portion of the airport farthest from the portion that would be used by full-scale aircraft taking off or landing under the current wind conditions;

g. The take-off point of the models shall be at least 600 feet from any highway or building;

h. Not more than one such model shall be in the air at any given time, and the controls shall be so set that each such model will at all times during its flight remain within the airspace above the flagged area.

Frontiers of Aviation

(Continued from page 21)

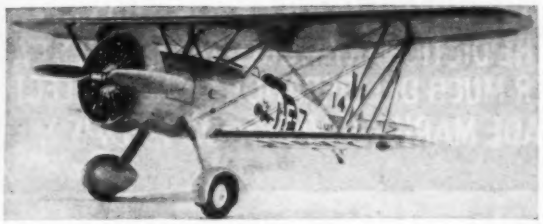
lage that much of its practical value was lost, thus the addition of fixed gun turrents. The one in the belly supplants a retractable turret to form better streamlining during combat, but lowers the cruising speed when on a bombardment mission. In some of the planes Junkers Jumo engines have been installed, which do not compare with the Daimler-Benz in streamline value because they require more air intake louvers. To make up for the loss in speed by the addition of the fixed gun turrets and the Jumo engines, the top contour of the nose of the fuselage has been made flush with no windshield, and the airplane now becomes known as the Heinkel 111J. (German designations go backwards in the alphabet.) With so many additions and subtractions made, the uniformity of its lines has been lost, and though there may be more comfort for the crew the speed is by no means what it should be.

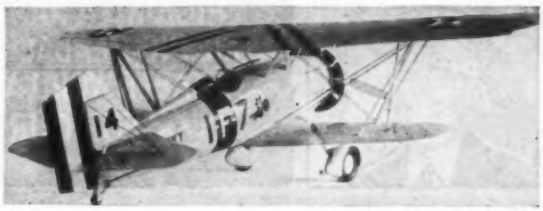
The Dornier DO 17—prototype—the Do-17—twin-engined, mid-wing light-bomber (in the same class as the He 111K) has very much more graceful lines and is a real performer. (See the Nov. issue of M.A.N. for a photo of this plane.)

The only other light, twin-engined bomber that Germany has is the new Messerschmitt, for which we have been anxiously waiting. Messerschmitt has built one of the finest sportplanes ever developed, and then it developed the record-breaking pursuit that unreliable sources say has done 469 m.p.h. Of course anxiety would prevail to see what Messerschmitt would produce in the twin-engined line. It was somewhat of a disappointment, however, when the plane that came forth was a big twin-engined, low-wing monoplane with the twin rudders extending "miles" from the fuselage. The wing is of high aspect ratio and the fuselage has a large glass enclosure on top for the crew. It is far from the usual Messerschmitt racy design. Either 1,070 hp. Daimler-Benz or Junkers Jumo engines can be used in the ship. The armament consists of a few machine guns and two 23 mm. "cannons." These five models mentioned compose about 80% of Germany's air force.

We have honestly tried not to be prejudiced in looking over the German light-bombers, but we cannot see how Germany will find much security with those ships. It is true that the Heinkel and Dornier ships were once considered outstanding and with great numbers of them flying Germany can be considered a great air power. However, most of her planes are now war-worn; she cannot build planes as rapidly as a French, English and American combination and she cannot produce planes

NEW CURTISS HAWK F11C4 NAVY PURSUIT





32½" Span. Length 22¾" 1" Scale. Weight 6 oz. Color grey, top wing yellow.

THE MOST EXCLUSIVE AND FINEST EQUIPPED MODEL IN THE WORLD. MOVABLE CONTROLS WORK FROM COCKPIT. A special de luxe model, one of the most beautiful ever made. Set contains a 4½" scale Wright Cyclone celluloid motor, detailed push rods, fins, etc., like real motor, 4½" aluminum cowl, 10" steel type carved prop shown, 2⅛" wheels, tail wheel, star and rudder insignia and lettering, rubber, windshield, instrument board, flying wires, 4 aluminum step plates, aluminum wing walks, ready cut wheel pants, washers, 3 oz. grey paint, ½ oz. yellow, ½ oz. red, 2 oz. glue, etc. All other parts are printed on balsa wood. 33"x14" scale drawing. Const. set, complete in labeled box, postpaid..... **$4.50**

LOCKHEED P23 NAVY FIGHTER

COMBINATION LAND AND SEA PLANE SET

32" Span. Length 20½". Weight 3½ oz. ¾" Scale. Model will rise from land or water in few feet. Construction set contains fuselage and pontoon formers, wing ribs, tips, etc., printed on balsa, a 3⅜" turned cowl front, 2 instrument boards, colored insignia, lettering, windshields, 9" carved scale flying prop shown, 3 oz. silver paint, 1 oz. cement, ½ oz. black, 2 oz. glue, 2" aluminum wheels, rubber and large 33" x 44" drawing of land and sea plane. Construction set in labeled gift box, postpaid..... **$2.95**

BOEING F4B4 NAVY FIGHTER

Solid Exhibition Model

22½" Span. Length 14½". ¾" Scale. Set contains completely finished balsa fuselage, with cockpit cut out, motor hole cut out and headrest attached; all you have to do is paint it. The wings, tail, and rudder are all cut to shape, but have to be sanded to proper curve. A 2" celluloid motor with aluminum motor front, 3¼" tapered aluminum cowl, 7" scale chromium plated propeller, celluloid wheels, complete set of colored paints, glue, filler, and full size drawing. Set, postpaid..... **$4.50**

SEVERSKY P35 ARMY PURSUIT

32" Span. Length 25". 1" Scale. Color, silver. A brand new model of the 1939 Bendix Trophy Winner P35. Set has 4" turned balsa motor front, 10" carved prop, balsa wheels, tail wheel, rubber, all parts printed on balsa, 3 oz. silver dope, ½ oz. black, 2 oz. glue, etc., insignia, and full size scale drawing. Const. set in labeled gift box, postpaid..... **$3.25**

LOCKHEED ELECTRA

27½" Span. Length 19". ½" Scale. This is an exhibition model, with all parts printed on balsa, two 2" celluloid motors, two 2" aluminum cowls, 4" chromium props, two 1½" M & M pneumatic air wheels, set of paints, and all parts. Set postpaid..... **$4.50**

NORTHROP A-17 ARMY FIGHTER

24" Span. Length 17". ½" Scale Set has 7" prop, turned motor front, wooden wheels and complete set of paints. Postpaid..... **$2.50**

BOEING B-17 FLYING FORTRESS

44" Span. Length 30". Color, silver. Set has all parts printed on balsa, four 2" turned balsa motor fronts, four 4" carved props, celluloid wheels, set of paints, glue, and full size drawing. Set postpaid..... **$5.60**

LOCKHEED VEGA NAVY FIGHTER

41" Span. Length 28". 1" Scale. Color, grey Set has turned motor front, all parts printed on balsa, colored paints, 11" prop shown, full size drawing. A wonderful flyer. Set, postpaid..... **$4.95**

CURTISS P36 ARMY PURSUIT

37" Span. 1" Scale. Color, silver Set has turned motor front, set of paints, glue, all parts printed on balsa, and full size drawing. Set, postpaid..... **$3.25**

DOUGLAS 043 GAS MODEL

50" Span. Color, blue and yellow Set has printed parts, complete set of paints, etc. Set without motor, prop, or wheels, postpaid..... **$4.95**

BOEING F4B4 NAVY FIGHTER

22½" Span. Length 14½". ¾" Scale. Set has 3" celluloid motor, 3¼" tapered aluminum cowl ring, set of paints, etc. Postpaid..... **$2.95**

BOEING P26A ARMY PURSUIT

22" Span. Length 17½". ¾" Scale Set has 3" celluloid motor, 3¼" tapered aluminum cowl ring, paints, etc. Postpaid..... **$2.75**

NEW 1940 CATALOG

Send 10c Coin

Large 7½" x 9½" beautifully illustrated catalog, showing large photos of the world's finest model aircraft, gas motors, gas models, and parts.

ORDERING INSTRUCTIONS: Orders sent west of Mississippi, add 15c postage—Foreign, 20c

NEW GRUMMAN F3F-1 NAVY FIGHTER

32" Span. Length 23¾". 1" Scale. Color grey, etc.

Const. set has all parts printed on balsa, set of 4-color paints, glue, wheels, colored insignia, rubber motor, 4" turned balsa motor front, full size drawing, and all parts to build as shown. Set, p.p..... **$3.75**

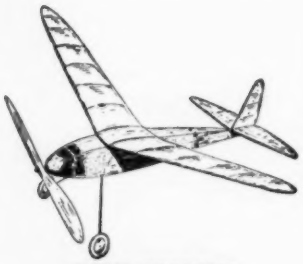
NEW HAWKER HURRICANE ENGLISH PURSUIT

27" Span. Length 20". ¾" Scale.

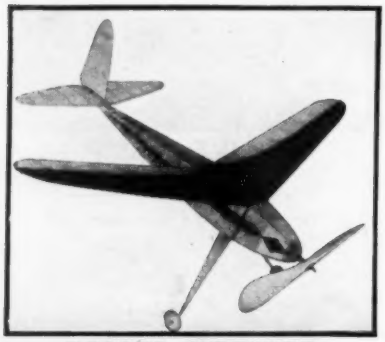
Set contains all parts printed on balsa, propeller, insignia, set of colored paints, wheels, full size drawing, and all parts to build as shown. Postpaid..... **$2.50**

MINIATURE AIRCRAFT CORP., 83 Low Terrace, Staten Island, New York

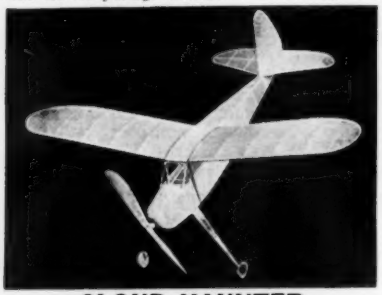
SAY FELLOWS:
PICKING A NAME FOR OUR *GAS MODEL PROPS* HAS BEEN ONE BIG HEADACHE, THE DICTIONARY WOULD NOT SUGGEST A SUITABLE WORD, AFTER MUCH DELIBERATION WE NOW SELECT D-G FOR OUR TRADE MARK (*DARN-GOOD PROPS*).
Barnes



THE CHAMP
Wing Area 191 sq. in.
The name Champ tells the story. It will out fly any model in its class. The kit is complete, nothing else necessary to build and fly the model. **Add 10c for postage** **$1.00**

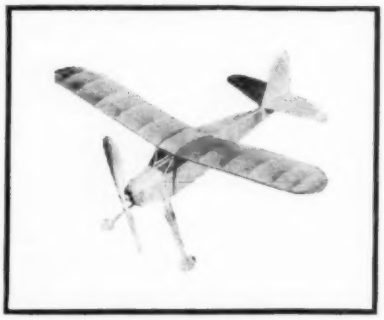


RECORD WRECKER
56 and 49 min. consecutive flights.
Newest Modelcraft Sensation! With a 26" span the Record Wrecker includes freewheeling unit, rubber lube, contest rubber, best quality balsa, cement, dope and large full size plans.
Add 10c for postage **50c**



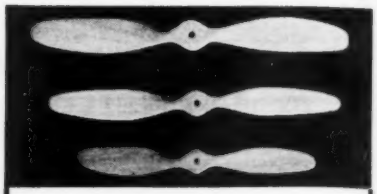
CLOUD HAUNTER
40 in. model, same ship as Pacific Ace, add 10c postage **50c**
W. R. Butterfield of Los Angeles made a flight of 2 hours and 40 min. with his Cloud Haunter.

SUPER HIGH WING 30 in.
A companion model to the Pacific Ace. Just as sweet a flying ship. Kit is complete. **Add 10c for postage** **25c**



30 in. PACIFIC ACE
A practical and durable commercial model. Easily constructed from well drawn and detailed plans. Kit contains an ample supply of first grade wood and high quality cement. Comparable with and outflies most dollar kits.
Add 10c for Postage **25c**

MODELCRAFT SOARING GLIDER
(Towline Glider)
31½" Soaring Glider has turned in many flights of better than one hour. Kit complete. **Add 10c Postage** **25c**



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GAS MODEL PROPS
Recognized as the finest in the country, D-G Props hold more first place records than all other props put together. FOR SALE BY ALL DEALERS AND JOBBERS WHO INSIST ON FIRST QUALITY MERCHANDISE. Stock up NOW—carry plenty of extras in your tool box. Complete range of sizes, 9", 10", 11", 12", 13", 13½", 14" each. **25¢**

FLIGHT TIMER
Adjustable from 1 second to 5 minutes. Weight ⅝ oz. The first dependable timer made just for models. **$1.25**

THE ALBATROSS 45 in.
Towline soaring glider. Here is the large glider you have been asking for. Kit is complete. **Add 10c for postage** **50c**

★ MODELCRAFT ★
THE LEADING SUPPLY HOUSE OF THE WEST ★ 7306 SOUTH VERMONT AVENUE, LOS ANGELES, CALIF.

MODELCRAFT WILL AWARD $100.00

AT THE 1940 NATIONALS

$50.00 to Winner of Class "B" and $50.00 to Winner of Class "C" Providing He Is Flying a Modelcraft Gas Job

BROWN

Model "D" $12.50 Post Paid
Model "C" $18.50 Post Paid
Model "B" $21.50 Post Paid
Model "M" $16.50 Post Paid

TORPEDO

Displacement .30 cu. in. 1/5 H. P. 8,000 r.p.m. with 12 in. prop.... **$16.50** Post Paid

HI-SPEED

1/7 H.P. 6500 R.P.M. Weight bare 3½ oz. Runs upright or inverted; fully assembled, complete with coil and condenser.

$12.75 POSTPAID

OHLSSON

MODEL "23"

Choke-full of power, speed and stamina!

SPECIFICATIONS

Horsepower 1/7. Bore ¾". Stroke ¾". Bare weight 4½ ozs., Height 3 9/10"..... —$10.50 Post Paid

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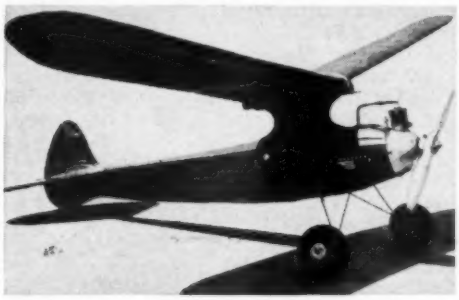
Buy a Modelcraft Kit and get in the Champion class. Send for FREE Catalog of latest Gas and Rubber Models and Supplies.

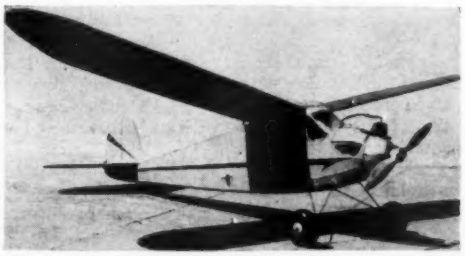


"INTERCEPTOR" THE RECORD CLIMBER

Wing Span 46", chord 7", flying weight 23 ozs. **Kit contains:** formed landing gear, beveled trailing edge, spun aluminum cowl, printed balsa parts, extra select gas model balsa, full size detailed plans showing both radial and beam type mounts, plenty of bamboo paper, cement, dope, complete test flight instructions and **gas model air wheels.**

Kit ..... **$2.95** POST PAID

PLANS ONLY 25c



"SKY BABY" HAS WHAT IT TAKES!

15¼ minutes on a 12 second engine run. Performance like this speaks louder than words. 'Nuff said. FLYING WEIGHT WITH OHLSSON "23"—27 ozs. Wing span 54"—Wing area 360 sq. inches. KIT CONTAINS spun aluminum cowl, air wheels, cement, dope, formed landing gear, colored gas model paper, printed ribs, select balsa, enlarged full size plans..... **$3.85**

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NOTICE TO DEALERS

We will pay $25.00 to the dealer who sells the winning Modelcraft Gas Kit in the 1940 Nationals.

THE SENSATIONAL "MISS TINY"

1st, 2nd, 3rd at Pomona, California. (First 20 second engine run contest) **1st at Honolulu, T. H.**—1st at Sunnyvale, California—**1st at Finley, Ohio**—2nd at **Detroit, 1939 Nationals.** A pocket edition of the Pacific Ace, 46" constant chord wing. For Ohlsson 23, Phantom and other ⅝" engines. Wing span, 46". **DeLuxe Kit** contains spun cowl, silk, 2½" Voit Air Wheels, cement, dope, die-cut ribs, plenty of good balsa, and full size plans. Price..... **$3.95**

STANDARD KIT same, but with bamboo paper covering.....**$2.95**

DRY KIT complete except for wheels, covering, cement and dope **$1.95**

PLANS ONLY 25c

"PACIFIC ACE," THE VETERAN PERFORMER

66 in. tapered wing. DE LUXE KIT contains tapered spars, beveled and tapered trailing edge, die-cut ribs, turned aluminum cowl, 1 qt. gas dope, 1 pt. cement, 3½ yds. super silk, formed landing gear, 4½ in. inflatable air wheels, dural wire, alum. tube, washers, bolts, haskalite, dural sheet, hook up wire, switch, selected hard balsa, full sized, black and white, plans with test flight instructions, complete..... **$8.50**

STANDARD KIT with bamboo paper, ½ pt. of dope, 1 pt. of cement and 3½ in. air wheels..... **$6.25**

DRY KIT same as above without cement, dope, silk or wheels **$4.75**

PLANS ONLY 50c

MODELCRAFT

THE LEADING SUPPLY HOUSE OF THE WEST ★ 7306 SOUTH VERMONT AVENUE, LOS ANGELES, CALIF.

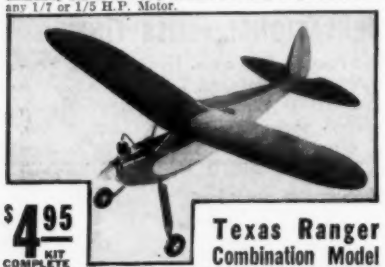
"G" LINE FLYING
Sensational - New - Thrilling

GAS POWERED SUPER SPEED PLANES FLOWN UNDER FULL CONTROL
NOT RADIO CONTROLLED
Protected By Patent Pend.

TIGER SHARK
SPEED DEMON

$4.95 KIT COMPLETE

The Super Streamlined TIGER SHARK, "G" Line Speed Plane, roars through the air at the unbelievable speed of from 50 to 75 M.P.H. Due to the inherent "G" Line Flying Stability, engineered into this design, the Shark is unusually stable and easy to control. May be powered with any 1/7 or 1/5 H.P. Motor.



$4.95 KIT COMPLETE

Texas Ranger
Combination Model

The TEXAS RANGER, a beautiful 45" High-Wing Cabin Sport Job, is a specially designed Combination FREE-FLIGHT and "G" LINE Flying Model. Has unusual climbing and flat gliding qualities in free flight and is very stable and easy to fly with the new "G" Line Control. May be powered with any 1/7 H.P. Motor.
DELUXE CONSTRUCTION KITS are most complete, including plenty of Balsa and Printed Parts. M & M Air Wheels, Prop Blank, Bamboo Paper, Spring Steel Wire, Ignition Wire, 50 Ft. "G" Line, generous supply of Cement and Dope, etc. Together with large fully detailed plans and instructions for building the ships and new "G" Line Control.
Rush in your order today. Enjoy New Thrills in Gas Model Flying.

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ONE CENTRAL SUPPLY SOURCE
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that have as much speed, because her engines are of lower horsepower. It is true that new engines are under test in Germany, but that is also true of her enemies. In power output per unit the United States, source of the main supply to the Allies, is 1,000 horsepower ahead of Germany at the present time. Therefore we wonder how Germany's planes would "rate" against American ships. We mean against such planes as the DOUGLAS DB-7 for France, the first three now undergoing flight tests; Douglas B-23 medium-bomber of which forty are reported to be a-building for the U. S. Army Air Corps (gun turret in tail under the rudder); Douglas A-20 and A-20A attack-bombers for the Air Corps (with and without turbo-superchargers, respectively); North American B-25 medium-bomber for the Air Corps; Martin B-26 medium-bomber on a still larger contract for the Air Corps; MARTIN French light-bomber that is almost identical to Martin's Model 167 being built in small quantity for the Air Corps, and Stearman's attack-bomber for the Air Corps. They would also have their troubles with the twin-engined Bell AIRACUDA or if North American should export some of her NA-40 attack-bombers.

The sleek lines of Germany's little "pea shooters," the Heinkel 112 type, has also showed signs of fast production, and many of its curves have been put into straight lines . . . such as the rudder with very sharp corners. The Messerschmitt, which did not do so well in Spain is still, according to reports from Europe, upholding its reputation, as France's Curtiss P-36 pursuits are able to outmaneuver them. Again comparing our own products to Herr Hitler's two "standbys" we have several hundred Curtiss P-40 interceptor-pursuits on order; Allison powered P-37s; Curtiss P-42 with completely enclosed radial engine; Bell P-39 with Allison engine at the center of gravity; $2,839,000 worth of a later Bell single-place pursuit-interceptor; Seversky P-41 and P-43 pursuits; $3,478,000 worth of a still later Seversky designed interceptor; Vultee's new interceptor pursuit with completely enclosed radial engine; Lockheed's P-38 and modification of that model, P-39, in large production now. And then there are the Curtiss and Grumman single-place pursuits that very recently won U. S. Army Air Corps design competitions; as well as a twin-engined Grumman pursuit design.

The very latest in the navy, of the fighter class are the Grumman F4F-3 and the little Brewster mid-wing ship. The Grumman job recently copped a big order from the navy, and it is certainly something we never expected to see in anybody's navy. Square wing tips, square rudder, square elevators would give one reason to make the remark that the navy has gone back to "square riggers." The engine cowling had to be round, however, as Pratt & Whitney has not as yet developed any square Twin Rows. We do agree that these chopped off wing tips do have their merits, but we do not agree that large areas at the tips of not only the wings but at the tail surfaces, causing loads as great and greater at the tips than at the roots, is the answer to the best performing airplane. The pilot sits atop the fuselage in one of those "sore thumb" glass enclosures and makes a good target for the enemy. The ship is a development of the former Grumman mid-wing, single-seaters, and if the U. S. Naval Air Service is looking for an airplane to put on their secret list . . . the Grumman is a good one! If aircraft design has arrived at the point where this stub-tip business is the complete answer, the manufacture of aircraft will be as interesting as making safety pins.

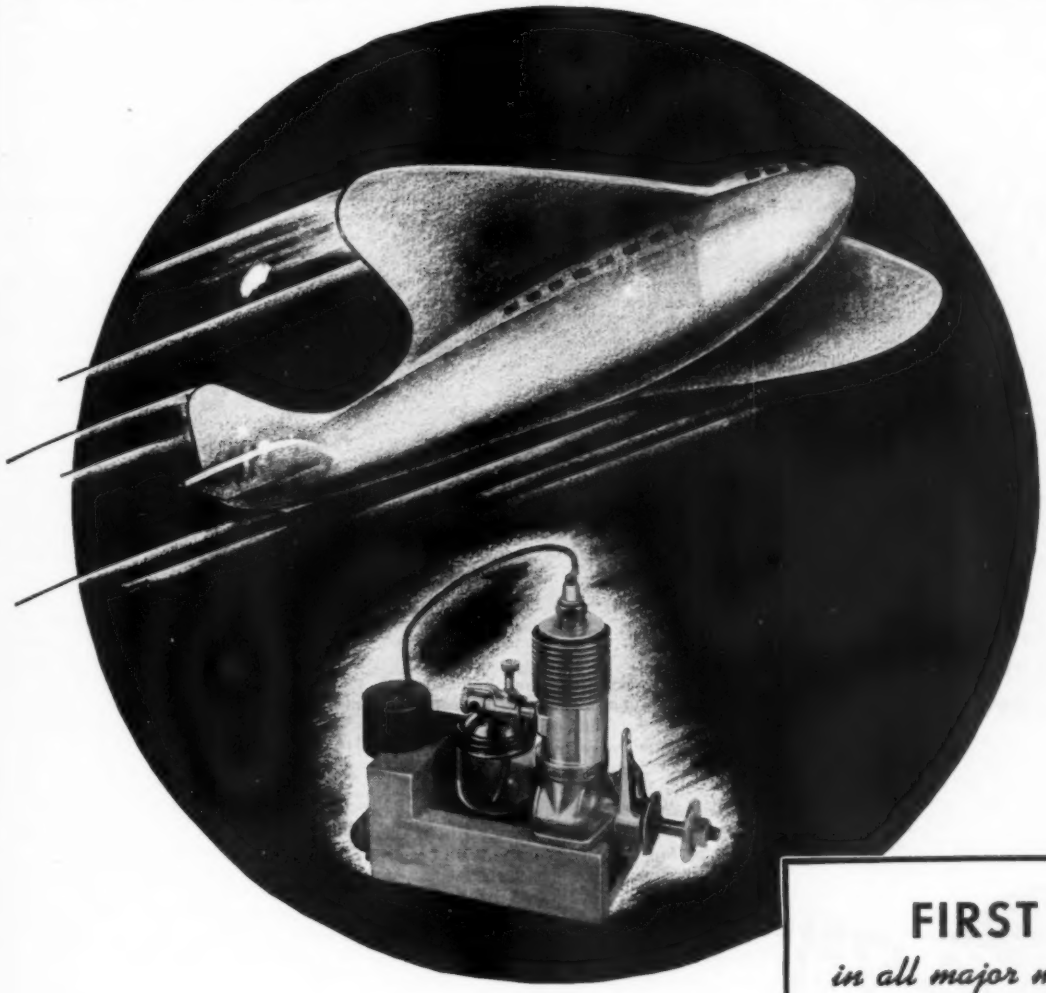
Getting back to German aircraft, we see only one four-engined design in the Luftwaffe, and that boasts of all straight lines with no two of them parallel. It is Junkers' Model 89, similar to Junkers' passenger-carrying Ju-90 that barely departed from England before Hitler pushed the button that started the war. Again comparing, we have the Boeings that have already seen a few years' service such as the B-15, B-17 and B-17A and now the B-17B to be followed by a later model; the B-17C of which Boeing has $8,102,892 worth on order for the U. S. Army Air Corps. Consolidated has an even faster model in production, the B-24, with a much larger order for B-24A four-engined bombers at $8,613,674. At this writing Douglas' huge six-engined B-19 bomber is about to take its first look out into the open air. In the multi-engined flying boat patrol-bomber class we do not figure so well at the present time, with Consolidated the only one in the business. Sikorsky has apparently dropped out unless it has gone ahead with design proposals and Martin is said to have lost their contract for their good-looking, twin-engined, gull-wing patrol bomber. Consolidated is now entered in a navy competition for multi-engined patrol bombers with Boeing, perhaps, its chief contender. As you know, they are now building a few four-engined navy boats and have about 200 more PBY twin-engined patrol bombers to build. Boeing has another order for six four-engined passenger boats for Pan-American Airways that will be a development of their "314" boats recently put into service. These are well adaptable for war purposes.

Now getting down to the observation planes, Germany has a little Henschel HS 126 parasol, strut-braced monoplane with rigid landing gear in the observation class that has weathered some action in the present war. Because of its slow speed it will be well suitable to control troop movements behind the lines, but is not suitable for operation over enemy territory. Germany is employing her light-bombers for reconnaisance work over French and English soil. Curtiss is now building a large quantity of high-wing, strut-braced observation planes, carrying a crew of two and powered by Pratt & Whitney 550 hp. engines. These are not built for speed, but will be used to control ground movements. In spite of the use the airplane is designed for, it seems rather ridiculous that wing struts were necessary to resort to in order to obtain sufficient visibility from a high-wing design in this day and age. Undoubtedly the wing is gulled into the top of the crew's glass enclosure atop the monocoque, all-metal fuselage. The landing gear is retractable and wing flaps are incorporated. Douglas and Vultee were winners in design competitions for planes of similar design.

Stinson is now getting under way with

YOU CAN DEPEND ON A BROWN JUNIOR MOTOR

for easy starting, smoothness, balanced power, and long life



Just flick the "prop" over and off she starts. Smooth as an "eight" because balanced power-impulse makes it that way and precision construction *keeps* it that way throughout its long, dependable life.

Over 50,000 Now in Use

Brown Junior Motors are the choice of experienced model plane, boat and race car builders. More Brown Junior Motors are in active service today than any other make. Motors built six years ago are still delivering championship performance—a tribute to the skill of this largest and most completely equipped model motor factory.

Ask your model supply dealer to show you the four Brown Junior models—or write to us for descriptive literature.

Model D—$12.50
Model B—$21.50
•
Model C—$18.50
Model M—$16.50
(Marine)

JUNIOR MOTORS CORPORATION
2545 N. Broad St., Philadelphia, Pa.

FIRST

in all major meets

Planes powered with Junior Motors won first place in each of thirteen major 1939 contests held in all parts of the United States. Year after year, Junior Motors head the field.

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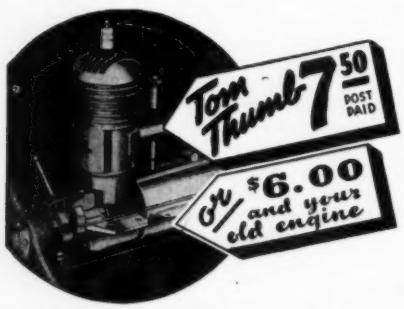
The Tom Thumb is the most powerful easy starting 1/5 H.P. engine made. Clip the coupon below, enclose money order for $7.50 (also your old motor for special $6.00 offer), and receive a *brand new* assembled and block tested Tom Thumb. Complete with fuel tank, coil, Champion spark plug, one piece cylinder and head and other modern features. Complete flying weight 10 oz. (less batteries). Bore 7/8"; Stroke 3/4".



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the construction of $1,853,451 worth of O-49 two-place observation planes, while Bellanca is building $181,693 worth of YO-50 ships and Ryan $132,020 worth of YO-51 ships. North American is still busy pumping out their O-47 "super" observation planes.

Even if we got down to our trainers we would have some planes whose performance would be very annoying to Germany's best. New planes of late are the North American BC-2 basic-combats of which we only have three with a later design going back to the BC-1A designation. About 92 BC-1A ships are being built by North American, and there will be trouble distinguishing them from Vultee's BC-3 ships as they are almost identical in appearance. Vultee's ship, however, has a portion of its fuselage glass-enclosed at the bottom and sides just aft of the wing fillets. The major changes in the BC-1A from the BC-1 have been the replacement in many instances of castings with aluminum forgings, a new tail design and stub wing tips. The wing center section has been made longer to house the lengthened landing gear. The portion of the fuselage aft of the crew enclosure is of monocoque, all-metal construction. 170 gallons of fuel, giving a range of 4.71 hours, is carried in wing integral tanks. The powerplant is a Pratt & Whitnew R-1340 direct-drive engine, differing from the BC-2 which had a geared drive and a three-bladed prop in place of a two-bladed one. The planes will have their unpainted natural color of polished aluminum. NA-49 and NA-61 airplanes similar to the BC-1 have been built for England and Canada, and, depending on the embargo, France and England may buy some more as well as other countries.

The War Department reports that North American also has a large batch of AT-1 airplanes on order, the first advanced trainer ever to be built for the Army. Also to be built at North American are BT-14 basic trainers while Vultee has $3,029,036 worth of BT-13 ships to build. All these planes have speeds close to 200 m.p.h., which would make them fairly suitable for combat work. In the very light training plane class we have a number of new planes . . . namely the Stearman PT-13B, PT-17, and PT-18, the Fairchild M-26, of which a million-and-a-half worth are on order for the air corps, and many other Waco, St. Louis and Ryan training types mentioned in past issues of MODEL AIRPLANE NEWS.

The training planes and the remainder of the Luftwaffe equipment is all rather negligible.

In spite of the war, commercial flying is progressing rapidly, and we hear that Piper Aircraft will attempt to produce a light all-metal amphibian which is news. Not to let Stinson outdo them, they are also coming out with a three-place, 75 hp. job. Rearwin has produced a new Sportster powered by a 90 hp. Ken Royce engine with full N.A.C.A. cowling. Lockheed's latest creation is their Lodestar transport that has already received a $250,000 contract from Mid-Continent Airlines. It is very similar to the Model 14 except that the fuselage has been extended aft, very much adding to the graceful lines of the airplane. It is 17-place. Top speed with full load is 236 m.p.h. with a cruising range of 1150 miles at an average of 218 m.p.h. The airplane weighs 17,500 pounds.

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MODEL AIRPLANE NEWS
551 5th Ave., New York City

Lockheed's four-engined, low-wing transport will have three rudders and a nose wheel and will be ready early in the summer. Following the navy's purchase of a Lockheed 12 equipped with a nose wheel, the army ordered a Lockheed C-40, which is the same as the Model 12, equipped with a nose wheel and designated as the C-40B. The airplane will be used as a test ship for the army air corps' extensive blind-landing experiments that are now progressing. It is one of the most thoroughly radio-equipped airplanes ever built, and its nose wheel feature will be a great asset to blind landings.

Transair Corporation's new tri-motor is of low-wing, tricycle landing gear design with one engine in the nose of the fuselage and the outboard engines in the leading edge of the wing. It is all-metal and carries 14 passengers. Span—80 ft., length 54 ft. 4 in. Lloyd Stearman is head of the company.

From now on the Seversky Aircraft Corp. will be known under the new name of Republic Aviation Corp. Major Alexander de Seversky, who has left the company, is reported as planning a new company.

Douglas' new commercial creation, the DC-6, has completed tests in the California Institute of Technology wind tunnel. Just what it will be like has not been disclosed. A new Douglas two-seater, low-wing, navy scout is under test that is somewhat similar to the former Northrop dive bombers. The landing gear retracts inwards and is flush with the bottom of the wing. Watch for many new navy jobs as the U. S. Navy has a considerable amount of money to spend on new equipment.

The Physics of the Airplane

(Continued from page 20)

defined as the ratio of the density of a body to the density of water at four degrees Centigrade. The factor of specific gravity is encountered widely in the field of aeronautical engineering. For instance, to assume a rather unusual case, the plastic characteristics of lead has caused its adaptation as a subsidiary landing gear fitting in a certain type of military airplane wherein its ability to absorb shock loading without undue permanent deformation has been utilized.

In order to maintain the dimensions of the designed fitting within the allowable weight limitations, the engineer refers to the specific gravity of the material. Now a cubic inch of lead weighs 11.36 times

as much as water. Therefore, the specific gravity of lead is 11.36. This is still, however, an abstract number so the engineer again refers back to the density of the material. In the c.g.s. units, the density and specific gravity of a substance are equivalent quantities since, under this system, a gram is defined as the weight of a cubic centimeter of water at four degrees centigrade. The density of lead in c.g.s. units is then seen to be 11.36 g/cm.^{3} The designer would prefer this quantity to be expressed in the units of the British system. The units are then transposed through the simple expedient of multiplying the specific gravity of the material by the factor 62.4, which represents the weight of a cubic foot of water. Thus the value 11.32 x 62.4 is 708.9 or the density of lead in pounds per cubic foot.

The student is cautioned at this point not to construe the same meaning for density and specific gravity, but rather, to differentiate between the two. Density is a concrete quantity and depends upon numercial units for its expression. Specific gravity, on the other hand, represents merely a ratio between two masses or weights and is, as a consequence, independent of the units employed in its determination. In the c.g.s. system, as explained above, density and specific gravity are numerically equal, since the density of water is one gram per cubic centimeter.

TABLE I

Material	Specific Gravity
Spruce	0.43
17STAL (Dural)	2.80
17SRTAL (Dural)	2.80
Chrome-Molybdenum Steel	7.90
Chrome-Molybdenum Steel (Heat Treated)	7.90
2SO (Wrought Aluminum)	2.71
2SH (Wrought Aluminum)	2.71
3SO (Wrought Aluminum)	2.73
3SH (Wrought Aluminum)	2.73
2rSTAL (Dural)	2.79

The principle of Archimedes which will be fully explained within the limits of this article, furnishes a reliable and simple method of determining the specific gravity of a substance. We are interested in the Archimedes principle since it deals with the flotation of seaplanes and flying boat hulls and their displacement. This law functions on the elementary corollary that the loss of weight of a heavy body suspended in water is equal to the weight of the water which is displaced. Stated somewhat differently, the weight of a volume of water may be said to equal that of the suspended body. This is the principle of flotation. From this we can readily evolve the following equation:

$$\text{Specific Gravity} = \frac{\text{Weight of body}}{\text{Loss of weight in water}}$$

Example: A length of annealed copper tubing contemplated for use as a fuel feed line for an aircraft power plant weighs 1760 grams in air and 1560 grams in water. Its loss of weight is then 200 grams. This figure also represents the weight of the water which is displaced. Hence, the specific gravity of copper is:

$$\frac{1760}{2000} = 8.8$$

An elementary difficulty is presented in

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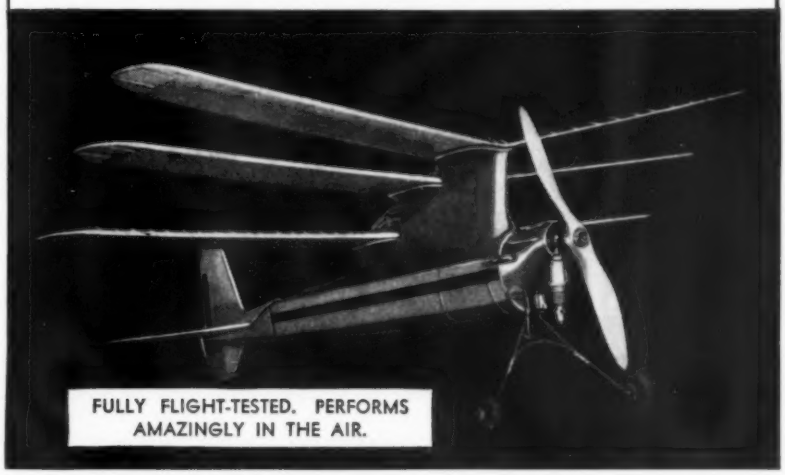
Presenting

The Nemeth Hi-Triwing

42" Flying Model

THE MOST AMAZING PERFORMANCE OF ANY DESIGN EVER FLOWN



Here's a new thrill you've been waiting for—a model that's really new from prop to rudder—a new thrill to build, and a double new thrill to fly! The Nemeth Hi-Triwing is different from anything you've ever built before, and when finally comes the day to fly it, be prepared for startling performance. This radically new design has **33-1/3% more lift** per square inch of wing surface! 1800 foot per minute climb—beautiful stability—properly built, it won't dive, slip, stall, fall-off, or spin. Levels off into a shallow glide at predetermined altitude, and descends slowly under full control to the prettiest 3-point you ever saw.

SPECIFICATIONS

Wing spread, 42 inches; length over all, 38-1/2 inches; total weight, 2-1/2 lbs.; rate of climb, 1800 feet per minute; power plant, any 1/6 to 1/5 H.P. (inverted). Balance controlled by movable unit motor assembly. Wings demount unharmed on impact.

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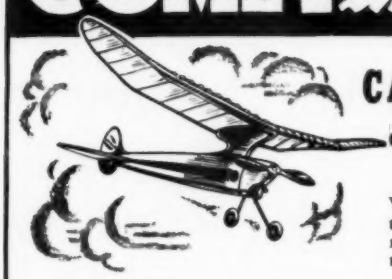

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SEE OFFER ON PAGE 29

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SCALE MODEL
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19 inch Model completely assembled.....$3.50 P.P.
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the case of bodies which are lighter than water. The upward, or buoyant, force which tends to make the body float at or near the surface of the liquid is counterbalanced by attaching a sinker of sufficient weight to immerse the body. The entire procedure consists in primarily determining the combined weight of the body and sinker with the former maintained above the surface of the water and the latter member immersed therein. Then the body is also submerged and the combined weight of the two members redetermined under this condition. It is evident that the change in weight results from the action of the buoyant force of the water on the body.

Expressing this statement somewhat differently, the loss of weight due to submerging the body will necessarily be equivalent to that of the volume of water displaced by the body. The volume of the body in cubic centimeters is thus determined. From this point onward, the density of the body is solved for in the same manner as in the preceding case.

For example, a sheet of cork destined for installation in a seaplane hull weighs 100 grams in air. When it is attached to a sinker and the sinker alone immersed in water, the combined weight of the cork and sinker becomes 400 grams. When both the sinker and the cork are immersed, the combined weight of the two becomes 150 grams. Determine the density of the cork.

Loss of weight due to submerging the body is equal to:

400 grams — 150 grams = 250 grams,

Volume of water displaced by the body = 250 centimeters.

$$\text{Density} = \frac{\text{Weight of body}}{\text{Volume}} = \frac{100 \text{ grams}}{250 \text{ cubic centimeters}}$$

= .04 per cubic centimeter.

Should the body under consideration be soluble in water, then of course some liquid of known density in which the body is not soluble must be substituted for the water. As in the previous cases, the loss of weight becomes equal to the weight of the liquid displaced. However, this quantity must now be divided by the density of the particular liquid employed in order to obtain the volume of the body. Finally, as before, the mass of the body, divided by this volume, gives the required density. A simple application of this case is given below:

Suppose a body is to be soluble in water but insoluble in alcohol, the density of the latter liquid being 0.8 gram per cubic centimeter. The body weighs 12 grams in air and 8 grams in alcohol as the initial assumption.

Weight of alcohol displaced 12 grams —8 grams = 4 grams.

Volume of alcohol displaced $\frac{4.0 \text{ grams}}{0.8}$ = 5 cubic centimeters. (This quantity is also the volume of the body.) Therefore, the density of the body is:

$\frac{12 \text{ grams}}{5 \text{ c.c.}}$ = 2.4 grams per cubic centimeter

Archimedes' principle upon which all of the foregoing examples are based is expressed as follows, and by this law all floating hulls of aircraft are subject to: "The loss of weight of a body immersed in a fluid is equal to the weight of the displaced fluid, or a body immersed in a fluid is buoyed up by a force equal to the weight of the fluid displaced by it." This principle may be adequately demonstrated by the action of a liquid medium on a rectangular body immersed therein. See Figure 1. The values of the pressures acting on the vertical sides of the body are of equal intensity and in the opposite directions. As a consequence, no motion will be imparted to the body. The downward force acting upon the upper face of the body is seen to be equal to the weight of a column of liquid having the area of the upper face of the body as a base and a height "h." An upward force, equal in intensity to the weight of a column of liquid, the base of which equals the area of the lower face of the suspended body, acts on the lower face. The height through which this upward force acts is symbolized by "H." It is equal to the depth of the lower face of the body below the surface of the liquid. This upward force exceeds the downward pressure by the weight of a column of liquid having a base equal to the area of the lower face of the body and a height equal to the height of the body or "H-h." By an inspection of the illustration, it becomes evident that the volume of this column is exactly equal to the volume of the liquid displaced by the immersed body, and furthermore, that the weight of the column is equal to the weight of the displaced liquid. Similar reasoning may be applied to bodies of any shape submerged in liquids of known density. The foregoing discussion can be effectively summed up in one brief statement: A body immersed in a liquid becomes lighter by the weight of the volume of liquid which it has displaced.

The direct applications of the Archimedian principle to aeronautics are manifold as well as to the science of hydrodynamics which is the study of the laws of motion as applied to liquids. Since seaplane hull design combines a study of flotation and hydrodynamics, we can see that the design of a hull which satisfies the best in each sphere is a complex problem, to say

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SPECIFICATIONS— Displacement .57 cubic inch—bore 9/10—stroke 9/10—two cycle ¼ **horsepower at 6500 r.p.m.** Height overall including spark plug 4½ inches. Length overall 5".

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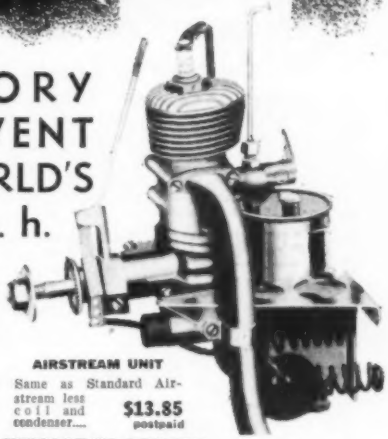

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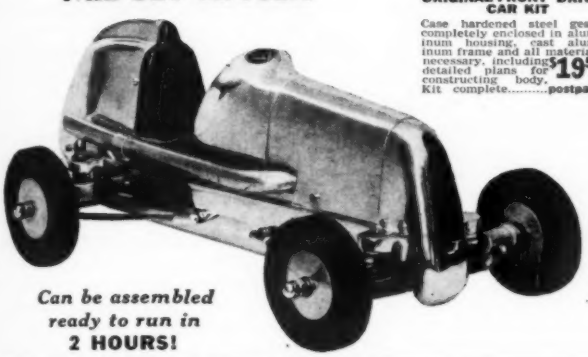

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nothing of the aerodynamic efficiency and low resistance.

Take the case of the seaplane hull for instance. We know that this structure will sink until the lifting force of the water becomes just sufficient to balance the weight of the seaplane. Consequently the seaplane will tend to sink more deeply when loaded than when empty. Also, the craft will sink deeper into fresh water than into salt water due to the greater density of the latter fluid medium.

Example: A flying boat hull has an overall length of 30 feet and a projected width of 4 feet. When loaded to capacity, the hull sinks 6 inches further into the water. What is the useful load of the craft?

Volume of water displaced = 30′ x 4′ x ½′ = 60 cubic feet.

Weight of water displaced = 60 cubic feet x 62.4 lbs. = 3744 pounds.

Useful load is weight of displaced water or 3744 pounds.

We can see that a hull float primarily as a result of the disposition of the material that comprises the hull. The same amount of material disposed in a cubic content of solid mass would not float but would sink. Therefore, a hull or body floats as a result of its shape and the greatest disposition of the material that comprises the body of hull. The solid body in this case would experience a buoyant force but this would not be sufficient to cause flotation as in the case where the material is disposed over a large cubical area and formed into a hull. This holds true for metals, since wood will float as a result of thousands of air cells and its low density compared to water.

The float and needle valve assembly in an aircraft engine carburetor relies for its proper functioning upon the application of the principle of Archimedes. Figure 2 illustrates this device. The float consists of a light, hollow spherical shell constructed of a metal alloy. As the liquid fuel enters the float chamber, the float is buoyed up by the gasoline, since its weight is less than an equal volume of liquid. This condition prevails until the needle valve, which is attached to the float by means of a suitable mechanical linkage, is closed. The gasoline is thus prevented from entering the float chamber. In this manner, a constant fuel level line can be maintained in the carburetor assembly.

A further application of Archimedes principle is found in the case of the battery hydrometer. This instrument is employed for the determination of the specific gravity of the electrolyte in airplane storage batteries. Figure 3 shows the details of this device. The instrument consists of a long cylindrical glass tube which is provided with a graduated glass stem. A sufficient amount of shot or mercury is placed at the lower extremity of the hydrometer to force it to sink to the desired level in the liquid under tests. The depth to which the hydrometer sinks is determined by the density of the liquid with which it is used. The float will submerge until the buoyancy of the material becomes sufficient to overcome the attraction of gravity on the float. The hydrometer then floats freely in the liquid and the point at which the surface of the liquid touches the stem can be read. The density of the liquid is determined directly from the graduated stem. In view of the fact that the weight of the float remains the same, it will tend to submerge deeper in light liquids than in heavier liquids. It is for this reason that the larger numbers are located near the bottom of the scale and the smaller numbers near the top.

See Figure 4 for the detail of a typical seaplane hull. We will now digress into a few problems of hull design for seaplanes. The size of the hull is a function of the necessary seaworthiness required. A sufficient reserve buoyancy is necessary, this being usually 4 to 5 times the normal buoyancy. The length of the hull is governed by the required tail arm length, which in most cases is three times the mean aerodynamic chord, taken from the center of gravity to the center of pressure on the tail. The length of the hull forward of the center of gravity is determined by the required position for the first step or that the buoyancy of the bow compartment must be sufficient when submerged, to resist a downward force exerted by the propeller during taxiing, plus the tendency to buoy up well in choppy waters.

The next important dimension which is determined is the beam of the hull which is approximately, in inches, equal to about four times the cube root of the total hull displacement in pounds. The lines of the hull, the planing bottom and the position and the number of steps are all a product of towing basin research and hydrodynamics. The take-off of a seaplane is determined by the maximum effective thrust obtainable from the power plants, the water and air resistance of the whole structure and the wing area. The maximum resistance to the wing lift occurs when the take-off speed from the water approaches 30 percent of the rated take-off speed. The float volume of a typical seaplane hull is equal to:

$$\text{Float volume} = \frac{\text{Gross Weight}}{\text{Wt. of 1 cu. ft. of water}}$$

The center of gravity of a seaplane hull is determined in a similar manner to that of the landplane fuselage. When the seaplane is at rest upon the water, the center of lift and the center of gravity lie on the same vertical line. The center of buoyancy, which is assumed to be the point on the hull where the buoyancy force of the water acts, is determined by the lines and the displacement of the hull; while the center of pressure acting upon the wing is found in the conventional manner. Another important characteristic of the seaplane hull is the metacentric height (see Figure 4), and is the point of intersection "M" of the vertical line drawn through the center of buoyancy of a hull, with the vertical line drawn through the new center of buoyancy (B′) when the hull is displaced, however, little. When M is above the center of gravity of the hull, the hull will be stable. When M is below the center of gravity of the hull, the hull will tend toward instability, and if it coincides, the hull will attain neutral stability.

We have seen in this discusison how important the Law of Archimedes is in relation to aeronautics in regard to seaplanes. Since the design of a seaplane involves both aerodynamics, fluid dynamics and hydrodynamics, the magnitude of the task of building and designing a seaplane such as the new Boeing 314 can be readily appreciated. How about a gas model of the China Clipper or new Boeing 314?

A Flying Fairchild 24-K

(Continued from page 23)

the wire. The tops of the struts are not glued to the fuselage and a small gap is left between them to permit the gear to spring back and prevent damage to the fuselage in the event of a hard landing. The remainder of the landing gear is completed later.

Tail Surfaces

Scale tail surfaces are shown on the plan and the test models flew very well without any changes but for those who aren't too interested in exact scale, we recommend the use of a slightly larger rudder at least. The stabilizer is built in one piece for strength. The rudder and stabilizer are constructed similarly. A complete frame is built using 1/16" sq. balsa

for ribs and spars and 1/16" thick outlines. When dry 1/16" x 3/64" strips are cemented to both sides and cut streamline to form ribs. Tail surfaces constructed in this manner will not warp easily.

Wing

The wing is made in two parts, the right and left halves. It will be necessary to make a left wing plan since only the right half is shown. Fourteen ribs cut from soft 1/16" sheet are needed: 10 are regular ribs, 2 are tip ribs and 2 ribs that join the fuselage are cut to the shape shown by the dotted lines. This is not the scale airfoil—it was substituted to provide better flights. Stack all like ribs together and sandpaper them to insure that they are identical. The inner ribs are tilted slightly so the dihedral angle will be correct when assembled. Very hard 1/16" sq. spars are used. Cut and sandpaper the leading and trailing edges as well as the tips to their proper shapes when the assembly is dry.

Propeller

Carve a propeller from very hard balsa. The size of the block is 1" x 1-5/8" x 9-1/4". Lay out the blank as shown. Always cut the back face of the blades first. The hardness of the wood will determine the thickness of the blades, the shape of which can be seen in the photos. The spinner is made in two pieces which are glued to the sides of the prop hub. About four coats of clear dope, with light sanding between each application, will produce a smooth finish. Equip the model with some kind of a free-wheel device so the glide will be improved.

The nose plug is made to fit the hole in the nose block. Its back is a piece of very hard balsa while the front disk is made from a piece of 1/32" plywood. It is advisable to drill the hole through the plug so about two degrees of both right- and down-thrust result. Glue washers to either end of the hole through the plug.

The propeller shaft is bent from a piece of .040 music wire. Place several washers between the prop and nose plug and bend a loop for a winder on the front of the shaft. A catch on the shaft will keep the wire from straightening when there is tension on the motor.

Covering

A neat attractive covering is a "must" for any fine flying-scale model. Colored tissue is used and since this is a commercial plane, most any color combination will be correct. Every bit of the structure is lightly but thoroughly sandpapered to properly prepare for a neat job. Cement cellophane side windows into place before starting to cover the fuselage. Bear in mind that only the longerons and stringers should touch the covering; if any formers might touch the paper, sand them enough to prevent it. The use of numerous small pieces on curved parts will help prevent wrinkles; on such parts as the top of the fuselage, five or six pieces will be needed to complete the covering. Use only enough banana oil adhesive to stick the extremities of the area being covered and lap the separate pieces carefully and neatly. The cowling and other similar parts are covered with tissue, too. Use several separate pieces of

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tissue on wing tips, etc. Adhesive should be applied to every rib and spar of the wing's undersurface to preserve the airfoils shape, otherwise just stick the covering at extreme edges. Once covered all parts are lightly sprayed with water to tighten the tissue. The tail surfaces and wings should be pinned to a flat surface in order that they don't warp. Any tissue decorations, such as license numbers and control surface outlines, should be cut from contrasting tissue and placed into position. The best way to do this is to brush light dope over the tissue trim, once it is in place, rather than trying to place it accurately after the adhesive has been applied. It is not difficult to improve the model's appearance with these scale effects, and it is really worth the time and effort expended.

Assembly

The parts are now assembled to complete the construction. Cement the windshield into place first; the pattern given may not fit your plane exactly so alter it if necessary before cutting one from celluloid. The stabilizer is slipped into place and then cemented fast. Offset the rudder enough to make the model glide in right circles—it should be exactly perpendicular to the stabilizer. Little difficulty will be experienced in placing the wing since the fuselage has built-in ribs with the correct incidence. The dihedral at each tip is 1-1/2" and bottles, cement cans, etc., can be used as supports until the cement is hard. Wing struts, shown in dotted lines with the wing plan, are made from 1/8" x 5/16" balsa strips. Sand them streamline and color dope them before fitting them in place; the length may need slight altering to fit your plane exactly. Cut the tissue from the wood at the junction of the struts and wing, etc. Wheels are 1-3/8" in diameter and they can be made from laminated balsa discs, or they may be purchased. Wheel pants improve the model's appearance, but they can be eliminated, if desired, since only deluxe models of the Fairchild are equipped with them. The shock strut of the landing gear is cemented firmly to the pants as shown, but the top is held in place by a small piece of soft wire which will permit the whole landing gear to spring back and forth without damaging the model. Color dope the propeller and wheel pants, if used, and add any minor details to complete the model.

Flying

Flight tests should be conducted over tall grass or weeds to prevent damage to the model. Depending on the model's finished weight, 10-12 strands of 1/8" brown rubber will be needed. The rubber should be lubricated, but remove any excess lube before placing the rubber in the fuselage to avoid splashing the sides. A 1/16" diameter bamboo pin holds the rubber motor in the rear. Test glide to determine if the balance is correct; addition of a bit of weight to the nose or tail will correct a stall or dive as the case may be. Once the glide is good, all power flight adjustments should be made at the nose plug. Tilt the line of thrust down to correct any tendency to "mush," and to the right or left to control the circle. The model pictured flies and glides in large right circles. For maximum flights attach a mechanical winder to the hook on the prop shaft—stretching the rubber before winding. The maximum number of turns is about 850. Get out in the wide open spaces to fly your "24," since it will probably fly in a manner to rival your endurance models.

The K.G. Lives Again

(Continued from page 13)

1/4-yard silk
Fillet covering.
3x5,—.040 alum.
Motor bearers.
(5) 3/32"x3/4 bolts
Motor mount assembly.
12"—.028 & .040 wire
Wing and tail hooks.
(2) bicycle spokes
Motor retainers.
24"—1/4 alum. tubing
Rudder outline.
1 pt. cement and 1 pt. clear dope.

Wing and Tail Construction

As the construction of the wing and stabilizer is identical, they will be described together. From the 1/8" to 1" drawings given on Plate II make full size layouts on which to build. The distances from the leading and trailing edges to the center line are given for each rib station. Connect these points guided by a strip of balsa held in place with pins or drawing curves.

Trace the shape of the trailing edges and tips from your layout onto 3/16" medium sheet balsa. Cement the sections together and shape to a triangular cross section with knife and sandpaper. Cut 1/16" deep notches in the trailing edges to receive the ribs.

Pin the trailing edges and the 3/16" square leading edges on the layout.

The ribs are shown in full size on Plate III from which they may be transferred to 1/16" sheet balsa. A metal or cardboard template may be made of the main wing ribs to speed up cutting them out. Cement the ribs in place, so that the top of each rib is 1/16" below the top of the trailing edge, to leave a recess in which the cap strips are later fitted.

Remove the wing frame from the layout and rejoin the panels at the correct dihedral, reenforcing the corners with gussets of 1/8" sheet. Insert the leading edge spars of 1/8" x 1/4" and the main spars of 1/8" x 1/2" hard balsa. The main spars have to be tapered to 1/8" x 3/8" at the tips, in the wing and to 1/8" x 1/4" in the stabilizer. Gussets of 1/8" sheet are used to reenforce the joints.

Apply cement liberally to the leading edge and pin the 1/16" sheet balsa covering to it. Bend the sheet over the ribs, moistening the upper surface slightly to facilitate bending, and glue the balsa to every rib and the leading edge spar. Cover one panel at a time, correcting any tendency to warp, before the cement has set solidly. Fit the cap strips in place using double width strips over the center ribs. Trim excess balsa from the leading edges and smooth the framework with successively finer grades of sandpaper. (See typical airfoil construction, Plate II.)

On Plate IV the wing and tail base patterns are given in full size. Parts E and the extra pairs of A and B form the wing and tail rests incorporated in the fuselage. These will not be needed until

next month, though they may be cut out and set aside if desired. Set a pair of auxiliary spars of 1/8" sheet in the center section. Cement the wing base outline composed of C-1, 2 and 3 in place, notching the noses of the center ribs and the auxiliary spars so that the top of the wing base may be cemented to the bottom corner of the leading edge. At the rear, the bottom of the wing base is flush with the bottom of the trailing edge. When dry, sand the surface of the wing base perfectly flat and insert the keys of 1/4" sheet balsa between the center ribs. (See wing base detail, Plate II.)

Cement the tail base A to the sides of the stabilizer center ribs. B is part of the rudder structure and is attached after the stabilizer is covered.

Covering and Rudder

Red double-tissue covering was used on the original. Though it requires going through the motions of covering twice, it has proven lighter and stronger than bamboo paper and affords a neatly colored job without painting.

Use fresh tissue to speed up work and protect against wrinkles. The first coat is applied with the grain running chordwise. Cover the bottom of the wing first, being careful to dope the tissue to the bottom of every rib to preserve the airfoil section. Elsewhere it is necessary to dope the paper only to the edges of the frame. Any difficulty that may be encountered in covering around the wing or tail rests can be eliminated by wetting the troublesome spot and then the tissue will almost fall in place. Spray the covered surfaces with water and when dry apply the second coat of tissue with the grain running spanwise. Do not dope the first coat. Spray again with water and when dry brush on two coats of clear dope. Between each watering and doping operation correct any warping tendency by holding the frame in the proper position till dry.

The rudder outline is formed of 1/4" O.D. aluminum tubing. This type of rudder can be easily bent to any desired setting, but cannot be knocked out of adjustment or warped by weather conditions. Flatten about 1" of the tubing, bend it over and tuck it under the leading edge of the stabilizer. Mount the rudder post B in place and cement the outline to the bottom. Set the keys of 1/8" sheet between the stabilizer center ribs and in the bottom of the rudder post. Fill in the rudder with 1/16" sheet around the stabilizer, using the outline of the center rib as a pattern. Cover with double tissue and cement small mounting hooks of .028 piano wire in place. (See tail base detail, Plate II.)

Check the alignment of the tail assembly to be sure the rudder is square and not offset in either direction.

The fuselage and motor mount will be described in detail next month.

The K-G-S was designed originally to be powered with a 1/5 horsepower, 0.6 cubic inch piston displacement engine. The weight of this engine was 33 ounces.

However the new ruling, which was decided upon at the recent Academy of Model Aeronautics meeting, specified that a plane shall have a weight-power ratio of 80 ounces for every one cubic inch of piston displacement of the engine with which it is powered. Thus, with a total weight of 33 ounces and a wing loading of 8 ounces per square foot, this plane cannot be powered with an engine which has a greater c.i.p.d. than .412. Nevertheless with a slight increase in weight, a number of available engines over this .412 c.i.p.d. value may be used.

A list of various engines which may be used, with their displacement, the minimum possible or required weight of the model and the wing loading in ounces per square foot which will result, is shown in the column at the right.

Engine	*Displacement*	*Minimum Possible or Required Weight*	*Wing Loading in Oz. per Sq. Ft.*
*Ohlsson 23	.23	33 oz.	8
*Hi-Speed Torpedo	.30	33 oz.	8
The next 5 engines give the best results in Class C			
Baby Cyclone	0.357	33 oz.	8
Mighty Midget	0.45	36 oz.	8.6
Gwin-Aero	0.45	36 oz.	8.6
Hurleman Aristocrat	0.488	38 oz.	9.1
Sky Chief	0.526	42 oz.	10
Dennymite	0.57	46 oz.	11
Brown	0.6	48 oz.	11.3
O. K.	0.6	48 oz.	11.3

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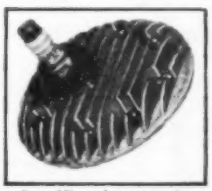

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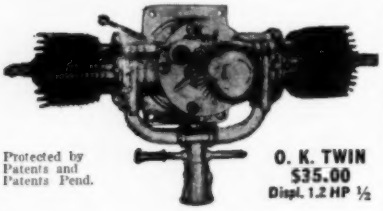

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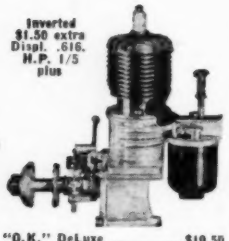

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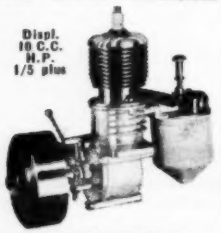

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*Using these engines, the K-G-S is eligible for Class B competition. With others it is eligible for Class C.

If the larger engines are to be used the required minimum weight can be made up easily by using large batteries and harder wood than specified in the plans.

With the limitation of available power, aerodynamic efficiency and stability have greater bearing on the minimum performance of a gas model. The K-G-S has these desirable qualities in full measure when equipped with any of the engines illustrated above, or those of equivalent displacement.

Fundamentals of Model Plane Design

(Continued from page 17)

As the span is four times the chord, the span will be 4×1.63 or 6.55 inches.

Fin Proportions

It is most convenient in a glider of this type to make the fin with the same chord value as the stabilizer. Therefore the fin chord should be 1.63 inches or about 1-5/8 inches.

As the area of the fin is to be 4.27 square inches, then the fin height should be $\frac{4.27}{1.63} = 2.62$ or about 2-5/8 inches.

Thus the dimensions of the tail surfaces have been established. Summarizing, they are:

Stabilizer—Span = 6.55 inches; Chord = 1.63 inches.

Fin—Height = 2-5/8 inches; Chord = 1.63 inches.

The distance from the wing to both tail surfaces, center to center, is about six inches.

Angle of Stabilizer

The size and position of the stabilizer are two factors that are very important in establishing the longitudinal stability of the glider. However, there is one more factor that not only provides this type of stability but also governs the character of the glider's maneuvers to a large extent. This is the angular setting of the stabilizer *relative to the wing*. If the chord of the stabilizer is parallel to the chord of the wing (imaginary line passing through leading and trailing edge), the area of the stabilizer would not be effective in correcting dives or stalls that might be executed by the glider; that is, not unless the wing is located at a point considerably above the level of the stabilizer. This is an unusual condition, so it will not be considered in this case. A normal position of the wing is one in which its center part is on a level with the stabilizer or very slightly above it. Under these conditions the angular difference between the wing and the stabilizer should be about one degree.

In a glider, the stabilizer is assumed to be horizontal. Therefore the wing should be set at an angle of plus one degree with the horizontal. (See plans.)

The Fuselage

Now that the size, shape and position of the wing and tail surfaces have been established, it is necessary to design the structure that will hold them in their correct relative positions.

This, in its simplest form, consists of a stick or "fuselage" disposed approximately parallel to the line of flight.

In order to determine the character of this part of the glider, it is most satisfactory to lay out the side view of the wing and tail surfaces on your drawing board. Then the outline of the fuselage may be drawn in to contact these parts in a most convenient and graceful manner.

The first step is to draw vertical lines six inches apart. These are the center lines of the wing and tail surfaces.

Next draw a horizontal line through the left vertical line. This is the normal line of flight and the line on which the trailing edge of the wing will be located—one inch to the right of the left vertical line. (See plans.)

The wing is to be set at an angle of plus one degree to this line. That is, the chord of the wing (in this case, its undersurface) will form an angle of one degree with the horizontal line. To draw an angle of one degree, mark a point 1/32 inch above the horizontal line, one inch to the left of the vertical line. Then draw a line through this point, intersecting the horizontal line one inch to the right of the vertical line. This is the line along which the center of the wing contacts the fuselage.

The stabilizer is to be placed slightly below the wing. So, draw a line curving down slightly rearward from the wing trailing edge, and then sweeping rearward *horizontally* until it crosses the vertical center line of the tail surfaces, as shown in the plans. This represents the upper side of the fuselage. Next draw in the stabilizer on this line. It will extend 13/16 inches to the left and right of the right vertical center line.

In order to establish the correct balance for the glider, the nose will have to be fairly long. The whole plane should balance at a point about 1/8 inch to the left of the wing center line. The long nose will help to weight the forward end of the glider, so that very little weight will have to be added to the tip of the nose to obtain the desired balance.

Thus the distance from the vertical center line of the wing to the tip of the nose should be equal to about 2/3 of the tail moment arm. This, then, will be four inches, as the tail moment arm is six inches.

The complete outline of the fuselage now may be drawn in; the nose extending forward the proper distance and the depth at any point along the length of the fuselage being approximately proportional to the stresses that it will have to stand.

In order to reduce the weight of the tail and therefore the consequent necessary length of the nose, the fuselage should be as light as possible to the rear of the wing. Therefore it is tapered gradually from wing to tail. The nose is made quite deep in comparison in order to add weight at this point. Also the fuselage to the rear of the wing should taper in width as well as depth. This taper is indicated by the relative widths of the two cross sections M-N and S-S'. At the extreme rear of the fuselage, beneath the stabilizer, the thickness may be only 1/8 inch. From the rear of the wing forward it should be 1/4 inch thick.

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Position of Fin

When you draw in the vertical fin the side view layout of the glider will be complete. However, before this may be done it is necessary to determine the vertical position of the fin. That is, whether or not the fin shall be above the stabilizer, below it or partially above or below. The best position is one in which about 2/3 of the fin is above the stabilizer and 1/3 below.

If you locate the fin on the drawing, so that 1-7/8 inches of its length is above the stabilizer, this should be approximately right. In this case, one inch of the fin will be below the stabilizer. If all of the fin is placed above the stabilizer the glider would have a tendency to bank and turn sharply. If it is below this surface the glider would fly a very straight course and resist tendencies of turning and banking. As we wish a happy medium between these two conditions, the fin is placed in the position suggested above. The vertical center line of the fin on the drawing is 2-5/8 inches long. The upper and lower edges of the fin may be beveled as shown, by sanding these edges. In this manner the fin will be slightly more efficient. To give your craft a trim appearance the sharp corners of the fin may be rounded as in the case of the wing and stabilizer.

Construction of Stabilizer and Fin

The stabilizer may be cut from 1/16" thick balsa, according to the pattern given on the drawings. When it has been cut to the proper outline, sand down the top front and rear edges with medium sandpaper. The top edges at the ends may be rounded in like manner. If you wish to refine the construction of this part, the top surface near the tips may be sanded thinner than at the center. Smooth off the whole stabilizer, top and bottom, with fine sandpaper.

The fin is made of light balsa, 1/16" thick, in the same manner except that both edges at the front and rear are sanded so that the fin is of uniform cross section and not cambered one way more than another.

When this is done cut the fin so that the top part is 1-7/8 inches long. This is called the "upper fin." The "lower fin" should be cut according to the pattern shown on the drawings. Cut away part of the lower fin to allow for the rear end of the fuselage. This fin should be cut along line D', as shown on the drawing.

Fuselage

The next step is to cut out the fuselage from a piece of medium balsa, 1/4" thick, according to the outline indicated. As it is desirable to have the rear end of the fuselage as light as possible, sand this part down on either side so that it tapers gradually from the rear edge of the wing to its rear tip. Cross section SS', on the drawing, shows a typical cross section. At point SS' the thickness of the fuselage should be 3/16 inch. At a point directly under the stabilizer it should be about 1/3 inch thick.

One of the most difficult operations is to cut the groove in the top of the fuselage at the point a which the wing is to be attached. This groove is shown in the front view on the drawing. This may be roughed out with a pen-knife and sanded down to the proper shape with sandpaper until the wing fits snugly in place.

All that remains now to finish this part is to round down the edges, as indicated in the cross sections, except at the points at which the wing and stabilizer are attached.

Assembly

We are now ready to assemble the various parts of the glider. First cement the wing into its groove and hold it in place with pins pressed down through the center of the wing into the fuselage. Apply plenty of cement in the grooves between the wing and the sides of the fuselage, as shown in the front view.

Next cement the stabilizer at its center to the rear end of the fuselage. This also may be held in place with pins, and, as in the case of the wing, apply cement in the grooves in the channels between the stabilizer and fuselage.

At this point we advise you to set aside the glider until the cement holding the wing and stabilizer has dried thoroughly. Don't let your impatience prompt you to "destroy" your handiwork until this has taken place. Then you may remove the pins from the wing and stabilizer and proceed to cement the upper fin in place to the top of the stabilizer directly over the fuselage. The lower fin should be cemented to the under edge of the fuselage and to the projecting rear tip of the stabilizer.

The problem here is to make certain that the fins are parallel with the fuselage center line and that they dry in a vertical

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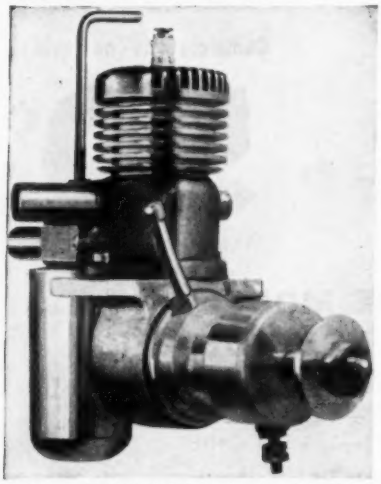

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position. If necessary hold them in the proper position with pins.

Now for the final step. At the nose of the fuselage you will note in the drawing that graphs have been indicated. Cut these in the top and lower edges of the nose.

Next determine the point at which the whole glider balances after removing all pins from the tail. It should balance at the point indicated as C.G. on the drawing. If the glider balances at a point to the rear of the C.G. point, wind some soft, iron wire around the nose through the grooves which have been cut. Enough wire should be applied in this manner to bring the balance at the point indicated as C.G.

Now you are ready to test your little ship. Take it out to some open space, free of obstructions, and launch it in a horizontal position with a gentle toss. It should glide steadily and eventually to a gentle landing. If the nose rises and the ship stalls more weight should be added to the nose. If it dives steeply (when it is properly launched) weight should be removed from the nose. Adjust the balance by adding or removing the proper amount of wire, until the glide of your little ship is smooth and graceful. After this your ship may be launched with greater speed. Finally, with a little practice, you should be able to make it perform any maneuver that you may fancy.

Talons of the U. S. Eagle

(Continued from page 9)

instead of to the rear as before.

The entire center wing section of the ship was redesigned to take this new type gear which features a single-strut oleo fork type covered on the outer portion with a large metal fairing door which closes inward after the gear sealing the opening. Varying also was the method of retraction; on the later model the gear swinging inward through the use of a worm gear drive. Set eccentrically with the outer wing bolting angle, the struts swing rearward into recesses in the wing, thus avoiding the front spar. This ship was used by Jacqueline Cochran in tests for a Bendix trans-continental dash last Autumn which failed to materialize for reasons stated by Lee Gehlbach in his popular series on the National Air Races in the November and December issues of MODEL AIRPLANE NEWS.

But more speed was the cry and Seversky again set to work, this time going over his speed-ship more thoroughly. Not content with his landing gear he raised it three inches, placed retracting landing gear doors on the bottom of the center section which folded outward over the lower portion of the wheels, sealing them completely. The oil cooler was placed inside the wing at the streamlined junction of the left wing and fuselage and the pilot's glass enclosure redesigned. This ship, the XP-43, met with instant favor with the U.S. Army Air Corps and an order for $3,505,500 was awarded the newly formed Republic Aviation Corporation.

Through? Satisfied? Content? Not on your life! Still farther Seversky's old cohorts, famed aeronautical engineers, went and the result is the striking Falcon of Death you see so vividly painted on our Cover this month: The Republic XP-40 Special!

From prop to rudder this tiny, powerful weapon of aerial terror is the answer to the problem of: "Is the Pursuit Ship Dead?" which we propounded so long ago. It screams NO! from its every detail, for it is today's ultimate in streamlined perfection, and our air corps will soon have nearly a hundred of them in actual squadron service!

Power is derived from a supercharged Pratt & Whitney Twin Wasp Senior engine, model SGR-1830-*27*.

Especially designed for high altitude power, this mighty giant develops 1260 horsepower at 17,500 feet, 1100 at 22,000 feet, 960 at 5,000 feet and has 1320 roaring, chanting horsepower available for one-minute duration at take-off. The engine is equipped with a down-draft carburetor with hot-air control, an air corps Type M-2 gun synchronizer system mounted on the vertical tachometer drive of the engine, and an automatic mixture control with which the pilot may ignore his mixture control handle in the cockpit except for emergencies. The propeller is an all-metal three-bladed Curtiss electrically-controlled full-feathering model of nine feet diameter. The engine mount is of chrome-molydenum welded steel tubing bolted to the fuselage frame.

The oil temperature regulator is mounted close inboard of the port wing and fuselage fairing and is provided with a controllable outlet just forward of the left landing gear recess in the underside of the center section. This outlet is provided with automatic by-pass with which the oil returns to the motor without cooling in low temperatures but passes through the cooler and again into the oil reservoir against the firewall within the power plant compartment.

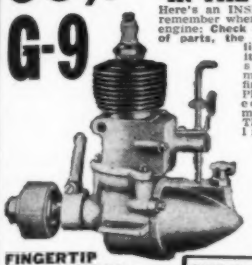
The exhaust collector ring is of the full shroud type with faired exits on each side of the lower engine cowl. The engine compartment is provided with controllable cooling air shutters which are opened for warming up on the ground or during steep climbs when the engine is apt to overheat.

The pilot's transparent panel assembly has been completely redesigned for streamlining and now sits low and sleek above the fuselage. The entire rear upper portion is of plastic acetate sheet preformed in place of the Alclad sheet covered sections of the earlier models.

The instruments include full sets of engine and navigation aids grouped in sections on the panel. The panel switch board is mounted on the lower left below the main instrument panel and includes machine-gun solenoid control, flying and landing lights, instrument panel lights, battery main line and generator control switches. A highly confidential gun sight control has been installed in which a light beam projects from a unit mounted on the pilot's floor beneath the instrument panel to a special glass panel mounted above the cockpit rim within the forward windshield. By switching on this light, in night or day, the image of a crosshair is thrown before the pilot's eyes and no forward gun sight is required. Radio equipment includes a command receiver, a command transmitter, a dynamotor, three coil sets, marker beacon receiver and control and pull boxes fitted with standard tuning

60% LESS PARTS IN THE G-9

G-9



Here's an INSIDE TIP to remember when buying an engine: Check the number of parts, the parts price list! Simplicity in construction means lower first cost PLUS most economical maintenance! The G-9 delivers its magnificent performance with (at the average) 60% LESS PARTS than others at all price ranges!

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units. The marker beacon receiver is a new development in which blind landings may be made, the receiver telling the pilot exactly how he is positioned over the airport transmitting the marker beacon beam.

Armament includes one 30 caliber Browning Type M-2 machine gun on the left-hand side and one 50 caliber Browning Type M-2 machine gun on the right-hand side. These are controlled and fired through the use of a gun impulse generator mounted on the engine vertical drive, an impulse tube, a gun trigger motor which operates and synchronizes the gun-fire and the stick remote control gun solenoid mounted on the impulse generator. Maximum speed of the guns is 1200 rounds per minute for the 30 caliber and 1000 rounds per minute for the 50 caliber model with provisions for one thousand rounds of ammunition.

In accordance with a new air corps order (which specifies no single-seat pursuits will be equipped with bomb racks with the exception of those intended for insular service) there are no bomb racks.

Flares are carried in two vertical racks in the aft portion of the fuselage and are released together with flare doors remotely from the cockpit. In addition a special pyrotechnic pistol is provided in the right-hand side of the cockpit together with six aircraft flares.

Engine throttle, mixture control, propeller pitch and feathering control and radio command set control switch are mounted on the control quadrant at the left-hand side of the pit. Just below are the landing gear and flap operating hydraulic control valve handles. The elevator and rudder trim tab controls are of the rotating wheel type mounted behind the control quadrant. A large stowage compartment is located just aft of the cockpit and the fuselage fuel tank.

The conventional Seversky retractable tail wheel is carried under the rear portion of the fuselage near the rudder. In flight the wheel folds rearward, being sealed by two hinging doors. Retraction is by hydraulics and is automatic with the retracting plates.

The rudder and elevators' frames are of stainless steel spot-welded construction and are of incredible lightness, with no aerodynamic or static balances required. Trim tabs manually controlled from the cockpit are in the trailing edge of all three surfaces. The fin and horizontal stabilizer is constructed of stainless steel riveted flush on the leading edge. All control surfaces, including the ailerons, are fabric covered.

The Republic XP-43A Special has a gross weight of 5644 pounds including 1320 pounds of useful load. The ship has a wing span of 36 feet and an over-all length of 26 feet 2 inches. It is 9 feet 10 inches high and the total wing area is 220 square feet. Wing loading is 25.82 pounds per square foot; power loading is 4.15, an astoundingly low figure thought impossible five years ago.

Fuel capacity of this aerial terror is 480 gallons stored in integral fuel tanks within the wing center section. In accordance with a new air corps order, this means 100 octane fuel and not the small ten per cent carried in special tanks while 87 octane was considered standard. All air corps gasoline is now 100 octane fuel, giving greater power, larger capacity due to the lower specific gravity of the higher octane and less engine wear. Oil, carried in a single reservoir forward of the fire-wall and at the top of the power plant section, is carried in the amount of 43 gallons.

Performance on the Republic contains the same breathtaking quality of earlier Seversky models: Speed! Top speed on the XP-40 Special is—hold your breath! —412 miles per hour! No longer a dream, or a speed record, but an actual FACT is that mythical 400 miles per hour velocity! Cruising speed at 67-1/2 per cent throttle is 356 miles per hour. Landing speed is 72 miles per hour, no ship for an amateur to fly, certainly, but in the hands of veteran fighting men, a wicked, slashing talon of the American eagle.

A high altitude fighting ship, this new racer has a fighting ceiling of 32,650 feet and an absolute ceiling of 33,875 feet! Cruising range is over 1450 miles with a 50 gallon reserve just in case!

Ninety complete service ships are on order with spare parts for ten more. Nineteen-forty should see these ghastly speed-demons in actual squadron service and in, perhaps . . . and a BIG perhaps! . . . in actual combat! The Republic XP-40 Special Air Corps Fighter is a triple challenge: to American aeronautical engineers to better its streamlined design and startling performance, to fighting pilots of the U.S. Air Corps to master its hurtling, screaming speed in actual flight, and to

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Build A Model Republic Pursuit

The streamlined, symmetrical outlines of this little hornet simplifies its construction but be accurate, or you'll find your fuselage way out of proportion. Cut out the three novel "silhouette-templates," now found exclusively in MODEL AIRPLANE NEWS scale models, and paste them on heavy cardboard. Select a block of good, clear balsa 5-5/8 x 1-1/8 inches square and slice it down to a round circular shape. Take a sheet of heavy sandpaper tacked to a block of wood and sand the fuselage down to shape. Repeat with a finer grade of sandpaper, paying close attention to the "silhouette-templates," making sure they are applied in their exact location as determined from the drawings.

Carve the wings out of a block of balsa 1/2" x 3-1/2" x 1-5/8" and sand to shape using templates D-D and E-E at their proper location. The tail surfaces are carved from a sheet of balsa and accurate outlines may be obtained by making templates of their drawings.

Details in amount and accuracy may be put in according to the builder's skill and attention to fineness and completeness. The entire ship is painted in natural aluminum finish. After painting, assemble the wings to the fuselage using the dihedral angle shown on the plans. Tail surfaces are cemented in at right angle to each other, as shown.

The propeller is best built up of three carved blades glued at the hub. And we sincerely recommend that you spend several hours, even at the expense of other items on the carving of a fine, accurate, detailed propeller—it makes or breaks a model's appearance.

The landing gear is built up of carved balsa and purchased wheels assembled and covered with a single sheet of balsa glued to the outboard face. The tail wheel may be secured with a bent pin and the retracting doors glued in the open position.

Build up the pilot's hatches with bamboo and cellophane and carve the oil cooler out of a small block of balsa. Paint in fuselage details and string black thread, in the manner shown on the drawings, to represent the radio antenna.

Paint in all insignia and markings in brilliant red, white and blue and finish the entire ship with a spraying of clear lacquer.

Does Aspect Ratio Increase Duration?

(Continued from page 9)

We have just discussed how aspect ratio will achieve these results.

Aspect ratio also has an effect on the performance of an airplane. This effect occurs in the region of minimum power, which is exactly the condition in model airplane flight. An increase in aspect ratio will very materially increase the initial rate of climb of an airplane. It is very often that favorable initial rate of climb that puts a model in reach of a favorable thermal with a resulting long flight. The same effect is also noticed in the absolute ceiling of an airplane. Very high power loadings in a design magnify these results and in some cases may even double the effect. This point is still more in favor of the model airplane.

A series of tests were made by the author on a Class B indoor tractor to corroborate the above theoretical deductions. These experiments were inspired by the statements of a large number of model builders that the effects of aspect ratio were reputably favorable, but the net effect was so small as not to justify the added structural and storage problems. Different wings of exactly the same area and planform were tried on the same model, using the same rubber and propeller characteristics. A very marked increase in both rate of climb and ceiling was noted with an increase in the aspect ratio. Changing the aspect ratio from six to ten enabled the model to increase its ceiling from approximately 75 feet to 95 feet with the same number of turns on the rubber; both these flights being on the same day within one hour, so the atmospheric effects can be ignored. The net result was a corresponding increase in the overall duration.

When it was definitely established that the larger aspect ratio had such a favorable effect on the model's endurance, serious flights were made to determine the best time obtainable. These flights involved adjustment of the model to enable the maximum number of turns to be put on the rubber without having the model lodge in the rafters; the best flight of the day being one of 21 minutes, 33 seconds, which very definitely puts the model in the class of the record holders. The climb and level flight were very steady and the glide was prolonged, the model landing with a completely dead stick. All of these good flight characteristics can be attributed to the wing.

It is admitted that the structural problems in the higher aspect ratio wings are more complex, but these can be solved by a more judicious choice of materials and improved section characteristics. Flapping tendencies in some of the wings used in the tests were noted, but these were eliminated by very careful balancing of the model and rearrangement of the braces in the wing structure. In no case, was the vibration enough to throw the model out of flight control.

Of course, all that has been said in the foregoing applying to the wing, also holds good for the tail. Increasing the aspect ratio prevents the tail from stalling too soon and this improves the longitudinal stability of the model.

The aspect ratio of any wing, either straight or tapered, even in model design, may be computed from one of two formulae. The aspect ratio is in any case equal to the square of the span divided by the wing area, or the span itself divided by the mean chord. That is,

$$A.R. = b^2/S = b/c_m$$

The author believes that any further appreciable increases in the times of indoor models will result from a more thorough understanding and use of certain aerodynamic principles, one of which is the aspect ratio. If any other model builders have conducted tests similar to those described above, the author would welcome correspondence on the subject.

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Air Ways

(Continued from page 27)

for a long time and he finds that this model is faster than the one built last year but is slightly less stable. Due to the speed, it has a very fast climb and a long glide to which the folding propeller contributes measurably.

The basis of the fuselage construction is a long balsa tube which houses the motor.

Fastened securely to the tube is a bulbous structure which performs the function of giving the fuselage the correct cross sectional area for contest purposes. This type of construction not only makes the model easy to build, but the weight is reduced to a minimum.

A beautiful piece of work, by Billy Nye Kinder of Radford, Virginia, Box 294, is shown in picture No. 4. It is an exact scale model of a Curtiss Hawk F-11C-4. It has a span of 32-1/4 inches and is complete in every detail, including movable controls operated from the cockpit. The model embodies 890 pieces and required 108 hours to complete. Billy is one of our cherished Air Ways Club members and would appreciate hearing from anyone who cares to correspond with him.

Picture No. 5 strayed into our Air Ways department from a very modest young man, for we do not know his name and he gives no details concerning his ship; except that it is an exact flying scale model, rubber powered, Rearwin. Though we have little information concerning it, the picture indicates that it is an extremely interesting job, and one might mistake it for a scale gas model. The plane is quite large, and the idea occurs, while looking at it, that possibly it would prove interesting to build fairly large rubber powered ships, test them as rubber powered ships and later power them with one of the small, extremely powerful gas engines that is now available.

Picture No. 6 shows the successful completion of a rather ambitious project—a detail scale model of a Martin Bomber built to 1/4 scale. If you will look closely you will note that there are dummy guns in the nose turret.

Very otten the sign of a carefully constructed model is the manner in which the propellers are fashioned. Too many times model builders spend hours building a model in careful detail. Then in their impatience to see their work completed, they "stick on" some misproportioned and carelessly made propeller. Carl and Tony Riccardi of 5718 South Gramercy Place, Los Angeles, Calif., the builders, have not fallen prey to this urge; for, as you will note, the propellers have been fashioned very carefully, even to the controllable pitch hub. Other interesting features are the landing gear and landing lights.

Model News from Other Countries

New Zealand

We hear from Mr. L. H. Annesley, Hon. Secretary of the Model Aeronautical Association of Australia, 503 George Street, Sydney. He says:

"For the first time in model aviation history in Australia, our association conducted a 'National Championships.' While they were not on a scale equal to your own 'Nationals,' they were the largest ever conducted in our country. Approximately $500 worth of prizes were distributed over four Championships and the Grand Champion (on a point score basis) holds a trophy, valued at $700, for the ensuing year.

"The contests were held as follows:

"November 5th at Dumbleton. Petrol driven models. 9:30 A.M. to 5 P.M. Eight ounces to the square foot wing loading. Fuselage models. R.O.G. Twenty second motor run. Three flights. Aggregate time to count.

"November 12th at Maroubra Labour Famr Area. 9:30 to 12 noon. Weight rule rubber models. Fuselage R.O.G. From 12:30 to 1:30, Hand-launched gliders. From 1:30 to 5:30, Open hand-launched rubber models.

"The first prize in the petrol driven models division was a radio set and the first prize in each of the rubber driven sections was a gas motor. The winner of the hand-launched glider event received a stop watch."

Those who have read "Air Ways" for some time probably will have noted the discussion going on between Mr. Gordon P. Smith and other New Zealanders concerning the relative merits of British and American planes. We have a few additional comments on this matter, which come from Robert R. Fisher of Cambridge, New Zealand. It would be impossible to publish Mr. Fisher's letter in its entirety, due to its length. However here are a few pertinent remarks in answer to Mr. Smith:

"In your various issues Smith still refers to the 'ban' on American aircraft. I hope to clear the entire matter up by using the following quotation from Beau Sheil's book, 'Caesar of the Skies.' (P. 182, lines 1 to 11.)

"The Commonwealth regulations said, in effect, that the plane which had been flown across the Pacific Ocean by Smithy and Taylor could not be recognized as airworthy because it had only an Ameri-

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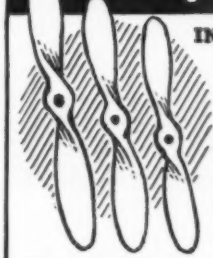

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can certificate to say it was. America did not count. America was not a signatory to the 'International Convention of Air Navigation' regulations. The reason for this was that America declined to be hamstrung by a set of regulations and requirements which she regarded as out of date and a drag on aviation progress.

"Sheil is referring to Sir Charles Kingsford-Smith's difficulty in obtaining registration for his 'Altair.'

"Smith infers that United States aircraft have been bought by New Zealand airlines. However only one company has bought American. (Union Airways—5 'Electras'; crashed 1.)

"Smith says that air travel has progressed in New Zealand since the importation of United States aircraft. Has it? Admittedly Union Airways extended its service from Palmerston North to Auckland, but surely this was a natural development after the Palmerston North-Dunedin route was established, and would have undoubtedly been undertaken irrespective of the aircraft used. Also United States aircraft permitted a general speed-up on Union Airway's routes. However, with the introduction of United States aircraft, New Zealand experiences its first airline accident. A motor of a U.A. Electra cut out while the machine was taking off and as it was unable to climb on one motor the airliner crashed. Fortunately no passengers were carried on that trip, but the crew and a small quantity of mail were incinerated. *(i.e. a lightly loaded Electra could not climb on one motor.)* Progress? Admittedly the much abused D.H. 86, which Smith so despises, is about 20 m.p.h. slower than the 'Electra', but its four engines would have prevented this accident, because with full load the three engines' ceiling is 13,500 ft. and in the worst two engine case, with engines on one side of the fuselage cut out, its full load ceiling is 2,500 ft.

"Incidentally, when 'Cook Strait Airways' extended its service it bought D.H. Rapides and when 'Air Travel' extended its services it bought a D.H. 'Fox Moth' and a D.H. 'Dragonfly.' American aircraft had nothing to do with this progress.

"Also I wish to emphasize that the only New Zealand airline which uses American aircraft (Union Airways) was then in conjunction with British equipment. (4 Electras, 3 D.H. 86, 2 D.H. Dragons.) I omitted to mention that 'Union' had taken over 'East Coast Airways'."

Smith says "Australia used ALL American transport." Does it? According to Lloyd Thomas in the "Aeroplane" the equipment of Australian Airways is as follows:

"Oantas—Empire Flying Boats (Short 'C' class); D.H. 86; D.H. Dragonflys. Carpenters—D.H. 86B. Australian National Airways—D.C. 2; D.C. 3; D.H. 86. Airlines of Australia—Stinson tri-motors (bought 4, crashed 2); D.H. Rapides and one D.C. 3."

MODEL AIRPLANE NEWS is not in a position to know the relative merits of the two types of craft in respect to their use in New Zealand. Therefore it will "sit on the sidelines," so to speak, and take note of what may be said on both sides of the question.

We wish to call attention to the fact that in many cases one airplane is far superior for one type of work, and another airplane superior for another type. When one refers to an airplane being "better than another" it is necessary to make known the purpose for which this airplane was intended and how it is being used in carrying out this purpose. If the object is reliability it would probably be best for New Zealand airlines to buy some of the old Curtiss Condors or others of this older type of ships; inasmuch as, in our opinion, these ships are far more reliable than present-day craft, though they lack the speed of present-day planes.

The editor believes that if airlines would pay more attention to the element of safety and reliability than to their mania for speed that not only fewer persons would be killed in the accidents which result from time to time, but many more people would be encouraged to make use of airlines as a means of transportation. We believe that in America, in the airlines' competition for business on the basis of speed, they are only hurting their own cause. Speed is more spectacular and creates considerable advertising. However reliability and safety are the two factors which will eventually mark the successful airline. One might say it costs the airlines much less to be safe. The first step in such a program, we believe, is to lower the landing speed from 70 m.p.h. which is tolerated by the Department of Commerce, to 50 m.p.h.

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CLUB NEWS

N. Y. City Parks

In keeping with an established program to provide competition in various forms of sports throughout the summer season, the Department of Parks of the City of New York, Borough of Brooklyn, sponsored a rubber meet on Saturday, May 20, at Sheep Meadow in Prospect Park, Brooklyn. Some 50 contestants entered the various events. The winners in the various classes were as follows: Hand Launched Glider—Herbert Cohen, Paul Malnove, and Jerry Stoloff. Cabin class—R. Phillips, George Gordon and W. Silverman. Senior scale—Samuel Eskenaisi and George Dressing. Junior scale—R. Mitchell, Robert McKay and W. McNeilly. Arnold Klonin and Anthony Tortuese won prizes for construction of gas models which were not flown because of limited space facilities.

N.A.A.

(Continued from page 15)

Leon Shulman, in discussing one-wheel gas models, declared: "One-wheelers are based on the sound physical treatise that forces should be concentrated. When gravity is centered low when the model is on the ground, the model is less liable to ground-loop or nose over compared to a model in which the weight is centered high above the ground. When a one-wheeler lands invariably it follows a straight line, veering little to right or left. In two wheel ships, one wheel may drag, or may not be centered, yet the model will ride straight to its stopping point because the wing still provides enough lift to hold it in its path."

Frank Zaic, in addition to some very amusing and enlightening remarks regarding his experiences in foreign model-building centers, presented a paper prepared by his brother, John, which concerned "Hi-start" gliders. The first plan for this type of outdoor glider to appear in an American publication was presented in MODEL AIRPLANE NEWS several months ago. In advancing arguments favoring the "Hi-start" catapult glider, which has also been termed the "kite-catapult" because of its leisurely and graceful climb, John wrote: "The

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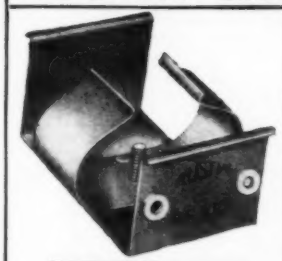

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hand-launched glider, considering all else equal, favors the husky fellow in a contest. The tow-line glider requires a double-jointed neck, or better still, two heads—one to watch where one steps while running and the other to observe the model to make sure it does not fly in an erratic fashion. Anyway—it does not look dignified! The catapult launch is thrilling, but the inexperienced soon become discouraged cementing glider pieces together."

Mr. DeSoto, who discussed the past history, present accomplishment and future of radio control model airplanes, delivered one of the most interesting talks at the conference. His concluding remarks were—"We are now entering upon that phase in the development of radio control where expansion and widespread growth will take the place of isolated individual research. I believe that this growth is predicated upon the close cooperation of model builders as a class and radio amateurs as a class. The science of radio control is too abstruse and complex for the model builder interested in it solely as an incidental part of his hobby. The radio amateur, on the other hand, is usually constitutionally incapable of building a ship that will fly. But the two working together can develop a hybrid art that will retain the best qualities of each and produce a new hobby whose interest and fascination will far exceed anything of the sort ever achieved before."

Mr. Gamache gave a very comprehensive story of Air Youth of America, its aims and purpose, and asked for the cooperation of the Academy of Model Aeronautics in an advisory capacity. Carl Goldberg had as his topic "Rational Model Design" and confined himself mostly to discussing gas models. Carl presented some very fine arguments which were well received by the assembled model builders. Mr. Grant spoke on the need for continued cooperation on the part of model builders with the coordinating agency for their nation-wide activities, the National Aeronautic Association.

Mr. Barclay told of early autogiro experiments as well as his own efforts in designing and flying a gas-powered model autogiro. Mr. Jacobs, who is in charge of several of the larger wind tunnels at N.A.C.A., drew some very interesting comparisons between present gas models and full-size airplanes in an effort to show that most gas models are overpowered. Mr. Shereshaw discussed future model gas engine designs and showed how future powerplants may be expected to be improved.

Conference Dinner Saturday Evening

After much valuable information had been imparted to those gathered at the conference, and many humorous remarks had been digested, the conference was closed by the chairman at 5:30 p.m., Saturday afternoon. Everyone hurried back to the Chamberlin Hotel in order to get in on the "Conference Feedbag"—anyway, that's the way the tickets read. The dinner turned out to be a most elaborate affair with 110 persons sitting down to partake of the delicious food.

During the meal Philip W. Pepoon of N.A.C.A. was called upon to announce the discovery of a new type of covering for indoor models. According to Mr. Pepoon this substance was so much thinner than microfilm that it was not even visible to the naked eye. It was said to have been composed of hydrogen atoms and affixed to an experimental indoor model's wing by a positive charge of electricity on the leading edge and a negative charge of electricity on the trailing edge. Under the direction of Mr. Weiss the experimental model was produced, duly wound, and then proceeded to dive to the floor just like any other uncovered indoor model. The

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3/16 sq.	9 5c	⅛x3/16	12 20c	Quart	65c	**Gas Model Silk**	
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¼x⅜	3 5c	3/16 sq.	8 20c	Pint	35c	**Sheet Celluloid**	
18" Balsa Sheets		¼ sq.	6 20c	Quart	65c	9x10 inches	10c
1/64x2	7 10c	¼x⅛	3 20c	**Tissue A A**		**Sheet Aluminum**	
1/32x2	10 10c	⅜ sq.	2 20c	P.P. Ready to run		White Doz.	15c
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3/32x2	8 10c	**Sheets 4 times 18"**		Ohlsson 23	16.50	Doz.	19c
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3" & 36" cost twice 18"; 3x36, 3 times.		3/16 flat	13' 5c	Ranger	15.75	One cent Doz.	
Bamboo		**PROPELLERS**		Synergy Ace	9.95	**Thrust Bearings**	
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1	3c	7c	**Reed**
1¾	4c	10c	1/32 10 ft. 3c
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3		34c	¼ 3 ft. 3c
Wire			**Prop Blocks**
.014 6 ft.		2c	½x¾x5 7 5c
.020 6 ft.		3c	½x¾x6 6 5c
.028 6 ft.		4c	⅝x1x8 3 5c
.034 6 ft.		6c	¾x1¼x10 3 8c
.040 6 ft.		7c	2x1½x12 3 9c
1/16 3 ft.		5c	1x1½x12 each 5c
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Prop Shafts			**Sheet Alum.** sq. ft. 6c
Small	5 for	3c	.003 10c .010 15c
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Washers			3/32-1/8 ft. 7c
⅛ or 3/16 O.D.			3/16-¼ ft. 9c
One cent Doz.			**Model Knife**
Thrust Bearings			Steel blade 10c
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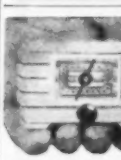

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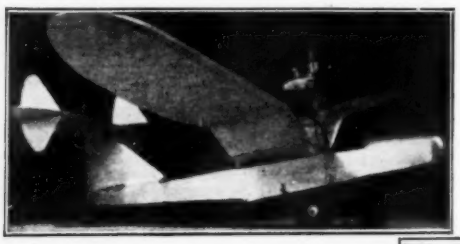

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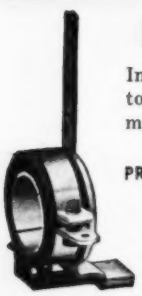

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joke was a good one while it lasted and two of the most surprised people were Irwin S. Polk, secretary-treasurer of the Academy, and Harold W. Kulick, official photographer for MODEL AIRPLANE NEWS. When the hydrogen covering was first announced, Mr. Polk exclaimed, "There's a real story. Think of a new covering being developed and offered to the public for the first time on such an auspicious occasion." Mr. Kulick took great pains to "get a shot" of the "experimental" model and its builders. In fact, the biggest laugh seemed to be on Harold.

To prove the points brought out in his talk on helicopters during the conference, Mr. Weiss, who is well-known for his varied and interesting aeromodeling plans, made several fine model helicopter flights, the best of which ended with the model inside a rather large overhead light. The dinner was closed with the showing of colored motion pictures taken during the 1939 State Championship Gas Model Contest held by the Virginia Model Association.

Academy Meeting Called To Order

At 9 p.m. on Saturday evening the Fall meeting of the Academy of Model Aeronautics was called to order by President Edward Roberts of Philadelphia. The meeting convened in the grand ballroom of the Chamberlin Hotel, the "site" of the conference dinner. The election of Academy officers for 1940 was announced as follows: President, Edward Roberts; East-Coast Vice-President, Irwin S. Polk of New York City; Mid-West Vice-President, Carl Goldberg of Chicago; and Secretary-Treasurer, Albert L. Lewis of Washington, D.C. It was stated that a number of candidates were recommended for the office of West-Coast Vice-President and that an election will be held to determine the person to hold this position.

Appointment of the following committees for 1940 was announced by President Roberts: NATIONAL CONTEST—Frank Nekimken, Arthur H. Vhay, Harry Copeland, H. T. Sommers, Nathan Polk, Gunnar Munnick and Frank Zaic. INTERNATIONAL COORDINATION—Frank Zaic, Gordon S. Light, Charles H. Grant and Edward Lidgard. RADIO CONTROL—Clinton B. DeSoto, Bruno Marchi, Philip Pepoon, David Gillmore, Walter Good and Jesse Bieberman. PUBLICATIONS—William R. Enyart, Charles H. Grant, Philip Zecchitella, William Winter, David C. Cooke, Lt. John L. Scherer, Ed Clarke, Frank Zaic and Wilbur Tyler. FLYING SCALE MODELS—Victor Fritz, Henry Struck, Roger Hammer, H. M. Jellison, Robert Crawford, Stanley Stanwick and Henry Thomas. INDOOR MODELS—Milton Huguelet, Curtis Janke, Hewitt Phillips, Jesse Bieberman, Carl Goldberg and Wilbur Tyler. OUTDOOR RUBBER MODELS—Henry Struck, Arthur Beckington, Edward Lidgard and Gordon Wisniewski. NATIONAL CONFERENCE—Albert L. Lewis, chairman; with Academy officers making up the balance of committee. GAS MODELS—Maxwell Bassett, Roy Marquardt, Allan Booton, Charles H. Grant, Louis Garami and Philip W. Pepoon. RESEARCH COMMITTEE—Herbert K. Weiss, Hewitt Phillips, Bruno Marchi, Lloyd Barclay, Arthur Brand, Robert Crawford, Roy Marquardt, Elbert J. Weathers, Philip W. Pepoon and Frank Zaic.

A most interesting announcement and one which proves that summer isn't so far away, was made concerning the 1940 National Model Airplane Contest. The following was read: "It is with distinct pleasure that on behalf of the Contest Board of the National Aeronautic Association, we announce the 1940 National Championship Model Airplane Contest will be held in Chicago under the sponsorship of the "Chicago Times" and the Chicago Park District. The contest probably will be conducted during the first week in July, as in other years. Complete details will be available far enough in advance to permit everyone to make advance preparation for participation in the 1940 meet, which promises to be bigger and better than ever."

Soon afterwards these five resolutions were adopted by Academy members:

RESOLVED: That in recognition of his contribution to model aeronautics in the United States through the establishment of Air Youth of America, Winthrop Rockefeller be elected an Honorary Fellow of the Academy of Model Aeronautics.

RESOLVED: That in recognition of his contribution to the advancement of model aeronautics through the sponsorship of the 1939 Wakefield Competition, Bernarr Macfadden be elected an Honorary Fellow of the Academy of Model Aeronautics.

RESOLVED: That in recognition of his outstanding efforts as director of the 1939 Wakefield Competition, Irwin S. Polk be accorded a vote of thanks by the Academy of Model Aeronautics.

RESOLVED: That in recognition for the part it played in conducting the 1939 Wakefield Competition, the Greater New York Chapter of the N.A.A. and its officers be accorded a vote of thanks by the Academy of Model Aeronautics.

RESOLVED: That the Academy of Model Aeronautics go on record as endorsing the aims and purposes of Air Youth of America and pledges its cooperation with the organization in every way possible.

The important rules adopted during this Academy meeting and which are to be submitted to the Contest Board of the N.A.A. for acceptance are as follows:

Scoring time for indoor models shall be

the longest of three official flights; that horizontal raised runways are permitted providing they are not more than six inches off the ground; gas models must R.O.G. unassisted, except where conditions prevent. Then Contest Directors may permit hand-launching of gas models with the understanding that such flights will not be eligible for record purposes; that in 1940 gas models must have a minimum wing loading of 8 ounces per square foot of wing area, a motor run of not more than 20 seconds, and must weigh at least 80 ounces for every cubic inch of motor(s) displacement. The cubic inch displacement classification for Class A, B and C, without the wing area classification, to continue as at present.

After further discussion and agreeing to meet during the 1940 National Meet, the Academy meeting was adjourned at 4:10 a.m., Sunday morning, November 26.

G.H.Q. Air Base Tour

Almost everyone hustled off to bed in order to be out at Langley Field at 10 a.m. to make a tour of inspection through the U. S. Army G.H.Q. Air Base. During this tour, conference members were privileged to see the army's new B-17-B bomber which represents the latest in "flying battleships." It is understood that the army is considering purchasing 500 of these latest type bombers.

After viewing the fighting ships, the large party of delegates divided into two groups, one to inspect the engine laboratories at the base, the other driving over to a far corner of Langley Field to watch demonstration gas flights by W. L. Lindsey of N.A.C.A., who flew an experimental 3-lb. Trojan-powered high-wing monoplane of conventional design fitted with a metal propeller; a flight by Leon Shulman of New York City with a one-wheel high-wing gas model which went O.O.S. (out-of-sight), but was afterwards recovered undamaged; and an attempt by Lloyd Barclay of N.A.C.A. to fly his gas-powered model autogiro in the face of a stiff wind. The vanes of Barclay's model were damaged by the wind before he had an opportunity to fly the craft, but not before everyone agreed that Lloyd had developed a most successful method of mounting rotors.

John Ogilvie of New York City had intended to fly a new Atom-powered high-wing gas model which was about the smallest conference members had ever seen. However the unfavorable wind conditions prevented him from making any flights at that time, but undoubtedly we shall hear more about this model later.

Upon completion of the trip through G.H.Q. and the exhibition of gas model flying, each conference delegate proceeded to pack up for home and say "so long" to the other modelers engaged in similar preparations.

Among the many well-known personalities attending the conference and Academy meeting not mentioned in this brief account were Nathan Polk of New York City; Paul K. Guillow of Wakefield, Mass.; Victor Fritz of Philadelphia; Stanley Stanwick of Boston; William Berry of Philadelphia; Carl Hopkins of Clarksburg, W. Va.; Phillip Zecchitella of Newark; and Dick Everett of Elm Grove, W. Va. Mr. Everett, incidentally, had the good fortune of just being selected to work at N.A.C.A., and as a newcomer to that experimental station represents another addition to the long list of modelplane builders who are finding their careers at N.A.C.A.

The editors of MODEL AIRPLANE NEWS know that all conference members join in declaring that this recent gathering was the most interesting in American model aviation history. It is hoped that a great many more enthusiasts will turn out for the next conference scheduled for sometime in 1940—date and place as yet undecided.

Model aviation cities make your bids!

The Megow Trophy Contest

ONE of the most keenly contested trophies at the 1939 National Model Meet was the Fred W. Megow Award, which goes to the team winning the most points at the Nationals. Point scoring is carefully based on the value of places won and the distance traveled by the club to get to the meet.

The 1939 winning team was from the Kresge Aero Club, Newark, N.J. Team winners were as follows: Benjamin Shereshaw, director; John Findra, Jr., Leon Shulman, Arthur Block, Roger Hammer, Henry Struck, Joseph Raspante, Gordon Murray, Herbert Friedlander, John Ogilvie and Walter Dickinson.

The 1940 competition promises to be even greater! For full details of this event, club directors and members should write to the National Aeronautic Association's Model Division, Dupont Circle, Washington, D.C.

The purposes and regulations governing

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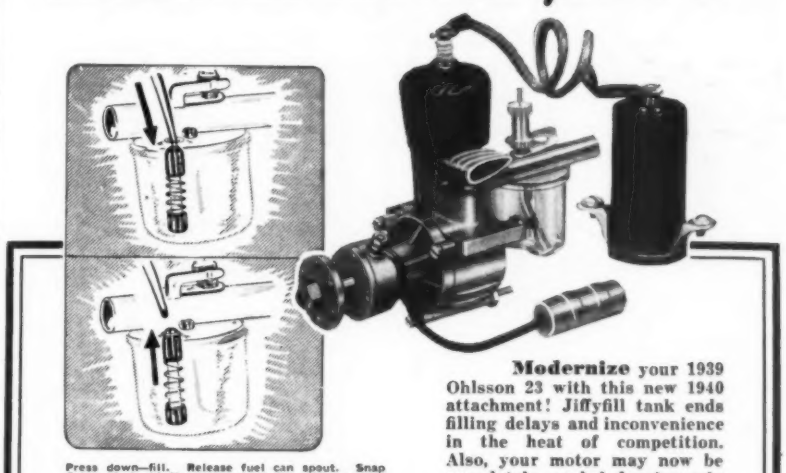

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the award of the Megow Award are as follows:

Purpose: To promote club activities to the extent that boys will compete as teams rather than individuals.

The Megow Trophy is perpetual and is offered annually to the club whose team wins most honors at the National Model Airplane Contest.

The following system is used to determine the group which has won highest honors:

Point System for Events:

Indoor Stick Model — Outdoor Stick Model
Indoor Cabin Model — Outdoor Cabin Model
Outdoor Flying Scale Model

The Following Points Will Apply:

	1	2	3	4	5	6	7
Radius of 100 miles	16	5	4	2	2	1	1
Radius of 200 miles	17	6	5	3	2	1	1
Radius of 400 miles	18	7	5	4	3	2	1
Radius of 700 miles	19	8	6	5	4	3	2
Greater than 700 miles	20	8	7	6	5	4	3

Point System for Events:

Gas Powered Model
Radio Controlled Model
Moffet International Cabin Model Event
Wakefield International Contest Eliminations

	1	2	3	4	5	6	7
Radius of 100 miles	22	7	2	2	2	1	1
Radius of 200 miles	24	9	4	3	3	2	2
Radium of 400 miles	26	11	6	4	4	3	2
Radius of 700 miles	28	13	8	6	5	4	3
Greater than 700 miles	30	15	10	8	6	5	4

Responsibility for the proper qualifications and determination of the winning team lies with the Contest Committee for the National Model Airplane Contest or similar Committee appointed by and responsible to the National Aeronautic Association.

Entry lists of the club membership competing on the teams must be filed with the National Contest Director by mail at least one week before the opening of the Contest. A special form for this to be obtained from the Contest Committee.

Clubs competing can enter teams of no more than twenty-five persons. This list must be registered in advance and no substitutions will be permitted after the start of the National Contest.

Members of the team must be bona-fide members of the club registered with the N.A.A., and must show N.A.A. club membership cards. Individual N.A.A. memberships cannot be registered in club competition.

An individual contestant cannot compete for more than one club.

Effective early in 1940, a charge will be made by the N.A.A. for "sanction" kits which have been sent out with each N.A.A. contest sanction issued to Contest Directors. The practice of sanctioning meets and record trials *at no charge* will be continued; but the kits containing helpful materials for running a meet will be optional, with the minimum charge for small-size kits set at $1.00.

New kits are expected to contain armbands for field police, officials, contestants, guests, mechanics, etc. Special forms for tabulating results and scoring flights, as well as special flight timing slips, are expected to be available. In addition, extra pieces of each enclosure will be available at cost.

The reason for the Model Division reverting back to its original policy of making a charge for "sanction" kits to partly cover the cost of materials sent out in them, is that up to December 1, 1939, more than 222 competitions for all types of modelplanes had been sanctioned by the Washington office. It is said to be impossible to provide valuable contest aids in such large numbers unless part of the expense is borne by the clubs using and desiring the materials.

One of the brightest bits of news to come out of Washington is the word that handsome new N.A.A. wing-emblem decals are now available.

These decals have a "wing spread" of 6-1/2-inches and are accurately printed in 5 colors. They are the same design as the wing lapel emblem which is given with each $1 model flyer's membership. The decals are sold in quantities less than 50 for 10c apiece, and in quantities of 50 or more for 5c apiece. They look grand on automobiles, luggage, and especially model boxes.

Clubs are urged to order their decals while the supply lasts.

Effective November 1, 1939, the Contest Board of N.A.A. announced that henceforth only N.A.A. Model Division members were eligible to compete in N.A.A.-sanctioned contests. This policy had not been strictly enforced in the past and it was found that in many sanctioned meets a large majority of the contestants were not N.A.A. members, and so unfamiliar with the rules and regulations governing such activity.

It was stated at the same time that no exceptions would be tolerated to this ruling. The Model Division has also sent a notice to all Contest Directors saying meet officials cannot compete in their own contests; that exact timing of gas model engine runs must be carried on; and that every consideration must be given to contestants in N.A.A.-sanctioned competitions.

It frequently happens that some clubs seem to carry on their usual activities with a great deal more success than others. One group which does quite nicely by itself is the Richmond Model Flying Club of Staten Island, New York City.

Bill Mott, the president of the aeromodeling organization, tells a bit about a fine system the group has for creating new interest:

"My club seems to be getting along quite well and I hope we will be able to give you some news in the spring. At present, we are holding exhibits throughout Staten Island. In my opinion, exhibits such as these do a great deal in developing interest in model aviation. A fact that substantiates this theory is that each exhibit is followed by a rush of applications for membership in our club.

"Our latest exhibit was held in a theatre at the request of the manager, who wanted it to tie in with an aero picture, '20,000 Men a Year.' All this may seem a bit obtuse, but I thought the idea of having the various clubs hold such exhibits was worth passing along, and I desired to explain how it works out in practice (at least with us). We have been offered two rooms in the local library for our next exhibit."

Club Meetings and Activities Aid Book!

The N.A.A. has prepared an excellent manual called the "Where Book" which tells just how and where aero clubs may obtain speakers from various aviation organizations; what valuable pamphlets are available without cost as well as the means

of securing colorful aviation stickers, movies, etc.

The "Where Book" is available to N.A.A. Model Division chapters in good standing (i.e.—those considered active) without charge. Additional copies and copies for inactive or non-affiliated groups are 50c each.

The Southern Connecticut Gas Model Club held its first annual contest on its own (leased) field at New Canaan, Conn., on Sunday, November 12, 1939. About 68 models were entered; more than 1,000 spectators witnessed the flights. More than $100 worth of prizes was distributed to the winners. Presentation of the awards was made by Al Lewis, director of the N.A.A. Model Division.

Whitman Wescott of Riverside, Conn., took high honors to win a silver trophy for the longest flight of the day, the time being 2:32 minutes. Top place winners were as follows:

GAS MODEL, CLASS C

1—Whitman Wescott, Riverside, Conn.—Thor model—1:29 av. time.
2—John Taubl, Noroton Heights, Conn.—Zipper—1:23.3 av. time.
3—Robert Campbell, Stamford, Conn.—Clipper—1:23 av. time.
4—Whitman Wescott, Riverside, Conn.—Soaring Eagle—1:21 av. time.

GAS MODEL, CLASSES A AND B

1—William Gillette, Noroton Hts.—Kestrel—:40 av. time.
2—Phillip Klienert, Noroton Hts.—Buccaneer 48—:30 av. time.
3—Harvey Blackman, New York City—Mercury—:28 av. time.
4—John Ogilvie, New York City—Original—:26 av. time.

Boston, Mass.—Jordan Marsh-Boston Traveler Junior Aviation League activities recently included a visit by actress Helen Twelvetrees to one of the League's bimonthly indoor meets at Irvington St. (Back Bay, Boston) armory. Emphasis in Boston aeromodeling circles is now being placed on the same events as found in the National meet.

A recent guest speaker at a J.A.L. Saturday session was Major C. E. Beck, director of the New England Aircraft School, who spoke on the subject of aviation and its opportunities in 1940.

Winners in a recent indoor competition conducted in the Irvington St. armory, which has an effective flying ceiling of not much more than 35 feet, were as follows: Stick, H. L. models—Gordon Cain, 10:35; Douglas Hannon, 8:14; Harry Lerman, 7:42; Robert Abrahamson, 7:00; Henry Gerrin, 5:36.

Fuselage, R.O.G. models—Ralph Brown, 9:55; Robert Abrahamson, 7:02; Irving Sherman, 6:13; Henry Gerrin, 6:08; Harry Lerman, 5:02. All flights were recorded according to the N.A.A. ruling that all model airplane endurance times shall be the average of three flights. This rule was inaugurated to provide for consistency in endurance-type aeromodeling competitions.

Recently Director Munnick turned in to N.A.A. 21 applications for new indoor and outdoor national records.

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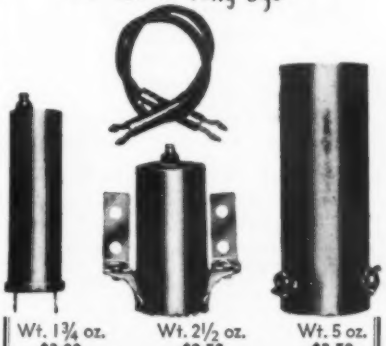
Is the Rocket Plane Next?

(Continued from page 7)

along these lines encouraged. Unfortunately, further details regarding the experiments were not forthcoming, due perhaps to military censorship. It is, however, known that a second machine was constructed, though how successful it was one cannot say.

In the United States, flight trials with rocket driven airplanes were first attempted in 1936. Unlike the Germans, however, the American group concentrated upon the development of a small "pilotless" plane designed expressly for the transportation of mail. The craft, designed under the supervision of Dr. Alexander Klemin of the Guggenheim School of Aeronautics at New York University, was an all-metal high-wing monoplane powered with a rocket motor designed by a group of technicians headed by Willy Ley, foremost experimenter of the famed German Rocket Society.

Two identical models were constructed in order to insure successful completion of a preplanned rocket-mail flight beginning at Greenwood Lake, N.Y., and terminating at Hewitt, New Jersey. Faulty construction, however, dogged the experimenters and both models crashed, being unable to withstand the terrific strain to which they were subjected by the rocket motor. Regardless of the failure, the experiment served to indicate the potentialities of the rocket mechanism and cast no unfavorable impression upon the method of propulsion. Lack of funds terminated the experiment prematurely and little scientific data could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Later—A smooth spot, a piece of cable. Boy Oh Boy, What SPEED! Forty Miles an Hour that lap!

It's warming up; look at it go; gaining speed every lap. Almost 50 M.P.H. that time. Still going—exhaust screaming—jumping the rough spots, faster, faster!

An ounce of gas, a little oil. "Wait Dad, the plug wire's loose."

"Oil those rear-wheel bearings, Son, and let her go; it's late. Only one more run."

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be assembled. Further research with rocket 'planes has not been undertaken in this country, due undoubtedly to the cost involved. Instead, American engineers have shown a preference towards the perfection of more powerful and more efficient motors for meteorological rocket operations, overlooking the rocket 'plane design situation until more favorable financial conditions permit an exhaustive experimental campaign.

Fortunately, the situation has been more favorable abroad, for recently a group of British industrialists are reported to have financed a very successful rocket 'plane project.

It is stated by Stan C. Johnstone, *New York Times* correspondent, that the British have installed a rocket mechanism "in a well-known make of airplane" and that the plane has been flown successfully for a period of about two years "using a continuous gas discharge as the sole means of propulsion."

The rocket mechanism, invented by Frank Whittle, a retired member of the Royal Air Force, consists of a centrifugal compressor, a turbine, and a combustion chamber with exhaust nozzles through which the propelling gases are discharged. (See Figure 1.)

Large quantities of air, drawn from the atmosphere, are passed through the compressor into an oil burning combustion chamber. Here, the air is heated at constant pressure and passed through a nozzle to a turbine coupled to the compressor shaft. Driving the compressor, the gases are then directed through a second expansion nozzle at the rear of the fuselage and discharged at high velocity, creating the forward thrust of the airplane. The speed of the unit may be controlled by the amount of fuel oil fed into the combustion chamber and by the temperature to which the air is heated. Higher temperatures, resulting from increased fuel consumption, have been found to augment the velocity of the exhaust gases and increase the initial thrust reaction.

In view of the marvelous results obtained it is indeed unfortunate that no actual performance figures could be released . . . this being a closely-guarded secret of the Royal Air Force and the inventor of the motor, Frank Whittle.

In order that one may get a better understanding of the efficient power available by rocket motors, however, we quote Dr. Sanger, well-known Austrian rocket experimenter, who for several years has been experimenting with a reaction motor to be used on aircraft as an auxiliary to the existing propeller mechanism.

"An example of the possibility of adapting the rocket motor economically and efficiently," writes Dr. Sanger, "is its use as an auxiliary to the existing propeller mechanism of pursuit planes. A pursuit plane of about 1700 kilograms, capable of about 500 kilometers per hour mean horizontal speed, climbs to an operating altitude of 6000 meters in about 8 minutes. By effective use of a rocket accessory permitting the plane to climb at an angle of 30 degrees, its operating altitude of 6000 meters would be reached in approximately 90 seconds or 1-1/2 minutes.

"The essential constituents of the ascent auxiliary are the tank installations and the rocket motor. Figure 2 is a schematic arrangement of the auxiliary, designed so that the center of gravity of the pursuit plane is not disturbed from its original location.

"Nitrogen gas flows from a pressure tank through a release valve and a reducing valve "RV" which keeps the pressure constant, then through a "T" fitting to the propellent tanks (liquid oxygen and oil) which are thus placed under a pressure of about 50 atmospheres. The oil and liquid oxygen are forced by this pressure through conduits leading to the motor but are controlled by the coupled valves "KV" operated from the cockpit. The total weight of the apparatus inclusive of the mountings and the fuels is 431 kilograms. Thus, the starting weight of the pursuit plane is increased to 2130 kilograms but the starting speed is raised about 12 per cent and the take off run found to have been shortened about 50 per cent."

Bearing these facts in mind the popularity of rocket experimentation is conceivable . . . particularly when by economical adaption of rocket accessories it becomes possible to modernize antiquated airplanes.

Unfortunately, in these troubled times, the perfection of rocket 'planes will be fostered for destructive purposes. However, the impetus created by rocketry within scientific circles is expected to survive the hostilities and used towards more constructive ends once the nations of the world have returned to peaceful negotiations and international traffic has again been restored.

FLASH NEWS!

ARMY—Copying the U. S. Navy's "routine flight" operations, seven huge Boeing B-17 bombers, under the command of Major General Delos C. Emmons, have just completed a long-distance over-water flight from Langley Field, Virginia to Brazil and return. Carrying Colonel Sergio Veloso Pendeneiras of the Brazilian Army and ten Brazilian officers, the huge ships will tour the army's air bases on an inspection mission.

"The bottle-neck of quantity aircraft production in this country is raw material," states the Army Industrial College at its recent meeting to discuss the air corps' new procurement program involving an expenditure of nearly one hundred million dollars. "Aluminum alloy sheet, extrusions, castings and forgings, even in this time of emergency, take from three to eight weeks for delivery, forcing manufacture of sorely needed fighting planes to a standstill. And in addition, the production of engine and plane accessories is lagging far behind that required to build our air corps into the arm of national defense it should be."

A circular proposal has been distributed to manufacturers for an army plane which will be slow instead of fast. If a ship could be built to fly slow enough it would be of greater value in directing artillery fire than the autogyro or the observation balloon.

While taking off from Montgomery, Alabama a huge Douglas C-34 Transport caught fire with several members of the House Military Affairs Committee aboard. The ship was hurriedly landed and the flames, caused by a faulty fuel tank cap,

extinguished.

Second Lieutenant Harvey E. Grieger, 24, was killed in the crash of a Seversky P-35 Pursuit ship while participating in maneuvers near Selfridge Field, Michigan. No reasons were given for the accident.

North American XB-25 high-speed bomber now under construction will be tricycled, twin-tailed, mid-wing powered by two Wright "Duplex" twin-row engines developing 1700 horsepower each at take-off. This is the most powerful engine yet used in air corps service airplanes.

North American XB-28, similar to XB-25, will be especially adapted to sub-stratosphere work and predicted top speed is 500 miles per hour above 35,000 feet where high-altitude winds blow.

Martin XB-26 bomber nearing completion in Baltimore. Twin-engined, tricycle, high-speed heavy bomber of which over 100 have been ordered.

Consolidated XB-24 four-motored bomber is smoothest designed ship of its type ever constructed. Tricycled, with provisions for more than four tons of bombs, it will be completed early next spring.

Beech C-45, Wasp Junior powered, light transport plane has been purchased for the exclusive use of General H. H. Arnold and members of air corps high command.

Newest Douglas is the XP-51 two-seater pursuit high wing type now on the design boards. Similar to Curtiss Navy XFI3C-1, the ship will have a high speed of over 450 miles per hour powered by Wright "Duplex" double-row radial.

NAVY—Patrol Squadron VP-2, attached to Patrol Wing One, San Diego area, has been awarded the Herbert Schiff memorial trophy for safety in flying. It is the only patrol squadron to have won the award a second time.

The war-time "flying leathernecks," members of the U. S. Marine who flew and fought in the Royal Flying Corps, have formed their own Veterans Association, electing James E. Nicholson of Baltimore National Commander.

The U. S. Navy's last existing dirigible will soon be demolished as an experiment. The "Los Angeles," decommissioned in July, 1932, has been subjected to rigorous tests during the past years including endurance tests on the fabric and paint, wind resistance tests on the field, and the dismantling and reconstruction of various parts of the huge frame. Under the direction of Commander J. L. Kenworthy, commanding officer of the Lakehurst (N.J.) station, the ship will be loaded to destruction with weights to determine the exact failing point of its various elements.

Representing more than thirty per cent of the entire navy's personnel, the San Diego Naval Base now has a total of 39,140 men in service, many of them stationed at North Island Naval Air Station with the various flying units there.

MANUFACTURING—DOUGLAS Aircraft Company, working against a backlog of over one hundred million dollars in domestic and foreign orders, has launched a program of employment which will increase the personnel to 17,000 employes by next spring. This huge group of workers, largest aircraft roster in the world, will speed production on France's DB-7-B3 (MODEL AIRPLANE NEWS, January, 1940) the air corps' A-20 and A-20A attack-bombers, the navy's DC-5 tricycle transports and BT-2 dive-bombers, and over one hundred commercial airliners of the DC-3 type.

NORTH AMERICAN Aviation, rushing production on 800 new British "Harvard" advanced trainers, National Guard 0-47B mid-wings, and air corps BC-1A Basic Combat, BT-14 Basic Trainer, AT-1 Advanced Trainer, XB-25 and XB-28 Bombers and basic combat ships on large order from China and Brazil. Backlog: $62,000,000; employes: 4700.

REPUBLIC Aviation Corporation has purchased the Farmingdale, L.I., building and property it has been leasing. Their latest, the XP-46 single-seat pursuit ship, will be turbo-supercharged!

BOEING Airplane Company of Seattle is dickering with missions from both France and England for large numbers of four-motored bombers. With a backlog of $27,954,175, mostly for air corps type B17B and C "Flying Fortress" bombers, the company employs 5500 men.

LOCKHEED Aircraft Corp. of Burbank has completed the last of 250 "Hudson" type medium bombers for the British Royal Air Force and are holding tools, jigs and dies in anticipation of a further order which will likely be forthcoming. Production continues on an order for 100 bombers for Australia, 36 twin-engine single-seat fighters (XP-38) for the air corps and orders for the models 12, 14 and "Lodestar" model transport ships.

The Mighty ATOM

Fits Into the Palm of Your Hand

Making enthusiastic friends wherever shown and flown—The Mighty ATOM is opening a new & thrilling era in Class 'A' field! A jewel in size (fits in the palm of your hand!) Yet a giant in performance (see the power guarantee below!)

CERTIFIED WEIGHT Including Tank, Timer & Spark Plug 1 3/4 OZS.

SPECIFICATIONS
Bore ..... 1/2"
Stroke ..... 1/2"
Displacement .097 cu. in.

NOW AT YOUR DEALER With Coil Condenser & Plug $12.50

GUARANTEED TO DEVELOP HIGHEST POWER TO WEIGHT RATIO

Compare ATOM with engines selling up to $20! Listen to the power throb; Observe how quickly AND EASILY ATOM starts—everytime! See the proud manner in which ATOM is made (lapped and machined to 1/10,000" accuracy!). No matter when you'll be ready to buy your first engine, or replace your present job—see The ATOM *NOW* at your dealer.

6c stamp brings ATOM Brochure—unique as ATOM itself! 15 especially prepared, detailed illustrations.

MICRODYNE ENGINES
Box 245-(M1) General Post Office NEW YORK, N. Y.

SEE OFFER ON PAGE 29

POLK'S Friend Makers

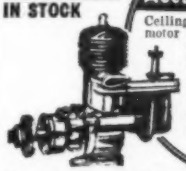
Veteran model builders remember POLK'S as "Pioneers in Power Plane Promotion." We're still up front—way ahead!

New Motors for Old

EVERY MODEL MOTOR MADE! IN STOCK

TRADE-INS ACCEPTED at TOP VALUE

Ceiling cash-allowance for old motor (regardless of age or condition) towards purchase of new one! Send motor for FREE allowance-inspection or describe, advising motor you wish! Unless satisfied, we return your motor—immediately!—prepaid!



MOTOR PARTS—REPAIRS! Complete stock, all makes! Repairs, by experts.

Now FREE ALLOWANCE INSPECTION

POLK'S Race Car PIT LARGEST IN EAST

'40 Mercury (Rear Dr.)	$23.50
'40 Mercury (Front Dr.)	19.50
Synchro, Rocket	19.00
Silver, Rocket	21.50
Meteor, Special	$21.50
C. A. R.	25.00
Mathews	32.50
Wasp (1/7 H.P.)	11.75

BUDGET PAYMENTS IF DESIRED!

6c Stamp Brings POLK'S Gas Catalog

POLK'S 429 Seventh Ave., Dept. M-Z NEW YORK

BERKELEY
Good Flying for 1940

New N.A.A. rules call for minimum wing loading of 8 oz. per sq. ft. of area and a power loading of 5 lbs. (8002) per cubic inch displacement of the motor. To help model builders in selecting their next model we have arranged the model and their proper motors in an easy-to-understand form. Ship which would be normally underweight can be made heavier by using larger batteries and heavier wheels.

FOR THE SMALLEST ENGINES UP TO .20 CUBIC INCHES

INCLUDING: MIGHTY ATOM, HUSKY, SYNCRO BEE, OLD BANTAM, MADEWELL

The only Class "A" Model which looks and performs like a real airplane. The original test model after fifty flights did not even have a small hole in the covering. Recommended to beginners. The kit has the completeness of all Berkeley Gas Models, Wooden Parts printed out, semi-finished nose block, metal fittings, ignition equipment, covering, cement and colored dopes.

Musketeer "42"

42" Wingspan

$1.95 Postpaid Less Wheels and Power Plant

For Large Class "A" and Small Class "B" Motors

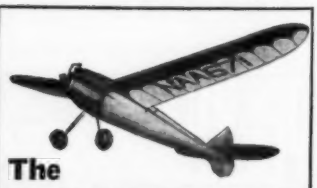
Bantam, Madewell, Mite, Ohlsson "23"

BUCCANEER "48"

Under the new N.A.A. contest rules you will have a real "hot" Class "A" winner in the Buccaneer "48". Simply change over to an Ohlsson "23" right on the field and you are ready for Class "B" contest winning. Kit includes everything to build model (except wheel & power plant), P.P. in U.S.A.

$2.95 Postpaid Less Wheels and Power Plant

For All Class "B" (.20 to .30 Cubic Inch Displacement) Engines



The CAVALIER "60"

60-Inch Wingspan—Monocoque Construction

Here is a ship that brings a new thrill to the small gas model class. It glides like the "Custom Cavalier" and climbs like a bullet. Lowest-price model ever offered with exclusive Monocoque construction. Install your Ohlsson or Hi-Speed in it and watch real action. Less wheels and power plant.... **$4.95 P.P.**

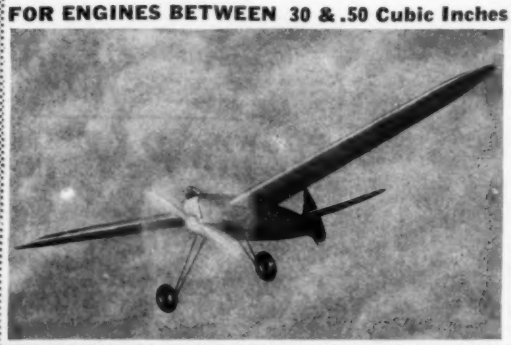
Musketeer "54" . . . . . 54" Wingspan

The newest Musketeer that sets a new standard for performance in its class. Watch this ship perform the next time you go to a contest. Did you ever see such a fast climb and floating glide in any model? Complete kit with colored dopes.

Less Wheels and Power Plant

$2.95 Postpaid

FOR ENGINES BETWEEN 30 & .50 Cubic Inches



Cavalier "Standard"

Top Performance With Hurleman Bunch and Baby Cyclone Motors

6-Ft. Wingspan

No model compares with it for its zippy climb. There is nothing like it anywhere. You can be the first in your neighborhood to fly one if you order now.

Kit is complete with full size plans, printed wood, and everything to build the model as illustrated, including colored dope. (Your choice of color.)

Less Wheels and Power Plant **$5.95 Postpaid**

BERKELEY
The Blue Ribbon Model Line

Higher aerodynamic efficiency and better streamlining make Berkeley-designed models superior under new N.A.A. ruling. Bank on Berkeley to come through on top!

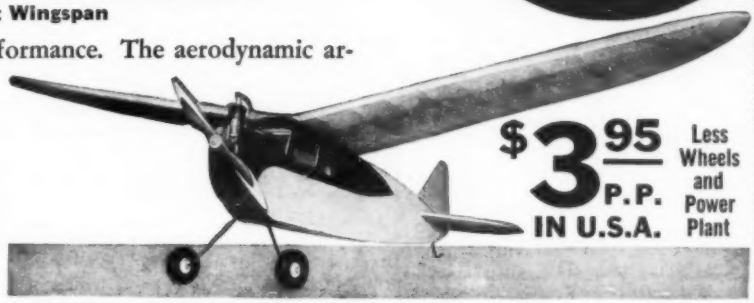
BERKELEY Will Win for You Too!

For Engines Between .50 and .60 Cubic Inches
Brown, Ohlsson, Denny, Skychief, Syncro

MUSKETEER "STANDARD"

6-Foot Wingspan

Designed for simplicity and performance. The aerodynamic arrangement is entirely new. The wing and stabilizer are set at extremely high angles, giving "Elevator" climb. Everything to build the model (except wheels and power plant) are included in the kit.



$3.95 P.P. IN U.S.A. Less Wheels and Power Plant

The BUCCANEER "STANDARD"

5½-Foot Wingspan

No model can compare with the enviable record of the "BUCCANEER-STANDARD." When competition is keen she comes out on top. Whether in the hands of expert or beginner, she will turn in the top-notch performance you will be proud of. Kit is complete with printed wood, detailed plans, 3 colors of dope and the quality materials that are found only in BERKELEY kits

Less Wheels and Power Plant **$5.00** Postpaid

COURIER SPORTSTER

6-Foot Wingspan

NEW YORK AND CALIFORNIA CHAMPION

The sweep back gull wing sport model that is the favorite for inverted motors.

$5.95 Postpaid Less Wheels and Power Plant

For Engines Over .60 Cubic Inches Displacement
Super-Cyclone, Forster Bros. and O. K. Twin

The SUPER BUCCANEER

7½ Foot Wingspan

The most famous ship in model building. Has won so many contests that it is impossible to keep an accurate account of its records. Kit is complete in every way. Printed out wood parts, full-size detailed plans, colored dopes.

Less Wheels and Power Plant **$8.50** P.P.

"CUSTOM" CAVALIER

9-Foot Wingspan—67" Overall Length

There is no model like the "Custom-Cavalier." It is the only model that has everything. The biggest threat in limited engine run competition because of its super-soaring ability. It has a sinking speed of less than one foot per second which means that the slightest thermal will send it climbing into the clouds. The "Custom-Cavalier" has been adopted by over fifteen colleges and universities for experimental and radio control work. Its rugged construction, husky landing gear and smooth glide make it possible to carry as high as 3½ lbs. payload with ease. When you have built the "Custom-Cavalier" you will have the "tops" in model airplanes. You will stand out among other model builders. Owning a "Custom-Cavalier" is a source of real satisfaction to any model builder. It is truly the "Rolls Royce of Model Airplanes."

Less Wheels and Power Plant **$15.00** Postpaid

SIMPLIFIED MONOCOQUE CONSTRUCTION

Removable Wing and Tail Units
Perfect cooling cowl
Filleted wing and tail
Extra strong landing gear
Tail adjustment tabs

9' Wingspan

NOW FREE INSTALLATION DRAWING

Special installation drawings of the Forster Engine for the "Custom-Cavalier" and "Super-Buccaneer," also drawings for O. K. Twin for "Custom-Cavalier." These are supplied free with every kit.

BERKELEY MODEL SUPPLIES

"FIRST" IN GAS MODELS AND RADIO CONTROL

DEPT. U-2

230 Steuben Street

BROOKLYN, N. Y.

ALLISON Engineering Company of Indianapolis has finished a new addition to the plant and is now at work on a backlog of $18,000,000 for the powerful liquid-cooled "V" engines for the U. S. Army Air Corps. Personnel is now at 2500 with employment gaining daily.

VULTEE Aircraft Company of Downey hard at work on the last of model Y1A-19 attack monoplanes and the first of model BT-13 for the U. S. Army Air Corps. Order just received for 75 attack-bombers for China at a cost of four million dollars, to be delivered in a "partially completed" form. They will be assembled in a secret plant deep in China's interior.

TIMM Aircraft Company of Van Nuys approaching test flight time on its new plastic two-seat trainer. Powered by a Kinner, 160 horsepower motor, the little low-wing ship has a span of 35 feet, a length of 25 feet, 7 inches and will have a top speed of 137 miles per hour. Built of secretly impregnated plywood moulded to shape and heated, it is cheap to build, light, fast and strong.

PEOPLE—Donald W. Douglas has been awarded the Daniel Guggenheim Medal for 1939 in recognition "of outstanding contributions to the design and construction of transport airplanes." Recipient of the Collier Trophy in 1935, Douglas has been honored by every important foundation, society and group in the world-wide aviation industry.

HOWARD HUGHES has been awarded the Collier Trophy for 1939 "for the greatest achievement in aviation in America." His contribution was his epoch-making round-the-world flight in 91 hours and 14 minutes in a special Lockheed Model 14 transport.

DR. JOHN D. BROCK, Kansas City's "flying doctor" who has taken to the air EVERY DAY for the past ten years has decided ten years is enough. He was asked: "Are you quiting?" "Well," he answered, "I've got to go down to the ranch tomorrow, I'll probably fly!" Twenty years sounds like an even better mark.

GOVERNOR GEORGE D. AIKEN, of Vermont, has just received his solo license after 14 hours of dual instruction.

ROGER Q. WILLIAMS of the Aviation Country Club, Toledo, heads a new plant which will construct a light plane which will "put flying within the reach of anyone who can drive an automobile." Parts will be fabricated by other companies and assembled in the new factory.

ORVILLE WRIGHT states that the famous plane he and his brother flew on December 27th, 1903 will remain permanently in the New Kensington Museum in England. Originally scheduled to be displayed for only six years, it has been twelve years abroad, although the U. S. Air Corps has tried unsuccessfully to obtain it for its famed Wright Field Historical Museum.

ADMIRAL RICHARD E. BYRD will use a Barkley-Grow seaplane christened "The Explorer" and a Beechcraft D-17A biplane to be flown from the back of the huge "Snow Cruiser" by U. S. Marine Corps pilot Theodore A. Petras on his Anarctic Expedition which is now under way.

WAR BUSINESS: $30,000,000 to Douglas Aircraft Company for 280 DB7-B3 twin-engine attack-bombers; $5,000,000 to Lockheed Aircraft for 50 more heavy-duty "Hudson" bombers for England; $70,000,000 to Pratt & Whitney for Twin Row Wasp engines to power the DB7-B3's; $50,000,000 to Curtiss-Wright for nearly one thousand more P-36C1 single-seat fighters for the French Armee de L'Air; and $4,000,000 to Republic Aviation (nee Seversky) for one hundred fast Seversky single-seat fighters for France.

A new world's refueling endurance record by Clyde Schlieper and Wes Carroll when they sat their seaplane Cub down at Long Beach on October 29th after 726 hours circling over Rosamond Dry Lake bed. For those who like statistics: Engine turned over 81 million times or the equivalent of 55,000 miles, twice 'round the world!

New Naval Air Bases: $8,330,000 awarded for construction of huge aviation outpost at San Juan, Puerto Rico; work already progressing on new bases at Sitka and Kodiak Islands, Alaska costing $12,739,000 and facilities at Kaneohe Bay and Pearl Harbor, Hawaii and Midway, Johnston and Palmyra Islands, costing $14,607,500.

Forced down after leaking 220 gallons of gasoline, Commander Humberto Gal'lino of the Peruvian Navy and Captain Victor Gal'lino of the Peruvian Army landed in Quayaquil, Ecuador only 700 miles short of their projected 4014 mile flight non-stop from New York to Lima, Peru.

Every Lockheed Model 14 and Hudson Bomber built has included 620 pounds of lead weight riveted into the tail: dead weight for balance. New Model 16 now aflying has six feet added to the tail eliminating this counter-balance necessity and carries two more passengers besides!

Germany, France and England have agreed to paint all commercial airliners a brilliant orange color for ease of identification. K.L.M.'s huge DC-3's have already been so painted.

Two Air Corps orders to Ryan: $197,000 for Primary Trainers and $132,000 for short-range observation planes.

New China airline: the one thousand mile Chungking-Kunming-Rangoon route started October 30th by Chinese-American owned China National Aviation Corporation.

Work begun on the navy's fourth major air base at Maizura, square in the middle of the Sea of Japan. Principally a coaling station since 1923, new docks, moorage and air field will be under way by December 1st.

Boys! Special Offer Extended for 1 More Month

MODEL AIRPLANE NEWS at any price would be a good buy! It is written for boys and their fathers. Every month 64 or more pages of clean, authentic, timely, information prepared and written in a manner appealing to every reader—data about model Planes, contests, new developments, plans, club news, etc. Don't miss a single issue.

$1.50 for 12 Issues
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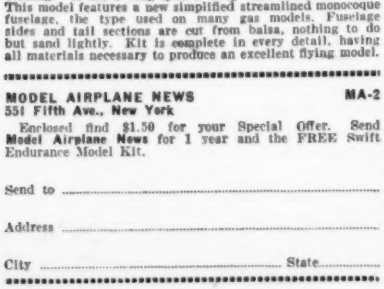

A complete flying endurance model that can be built in one evening. It has a wing span of 21½" and is 14" in length. This model features a new simplified streamlined monocoque fuselage, the type used on many gas models. Fuselage sides and tail sections are cut from balsa, nothing to do but sand lightly. Kit is complete in every detail, having all materials necessary to produce an excellent flying model.

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Advertise in this directory for quick profitable results! Rates 10c per word including name and address. Minimum 20 words. REMITTANCES MUST ACCOMPANY ALL ADS FOR THIS DIRECTORY. Advertisements for March issue must be in by January 6.

MODEL AIRPLANES—KITS—SUPPLIES

GIANT 28" ZEPPELINS are easy to build with our complete step-by-step instructions. Absolutely all materials included in kit—only $1.25 postpaid (well worth $2.50). Be first in your neighborhood to own one of these beautiful "Macon" Zeppelins. All your friends will be envious. Our great new 52 page 6x9 catalog is the talk of the country. 1500 items are listed, 500 illustrations. It is a necessity for any builder. Buy all your kits and supplies from one source. Send 10c which will be refunded with first order. All-Nation Hobby Shop, Dept. MN2, 1209 East 55th, Chicago.

DEALERS and Jobbers: Write for discount price list on washers, thrust bearings, and propeller shafts. Kayvalt Manufacturing Co., 2702 Dwight Ave., Dayton, Ohio.

DEALERS, Clubs, Schools: Send for low, complete wholesale list, including gas model supplies. Save money. Model Airplane Utility, 5307 New Utrecht Ave., Brooklyn, N.Y.

BROWN AERO RUBBER—Hodgman Rubber Company, 261 Fifth Avenue, New York City. Chicago Office: 612 South Wells Street. Dealers and manufacturers only.

DEALERS, Jobbers—Real profits on rubber and gas supplies. Stamp brings wholesale list. Waterbury Model Builders Supply, 119 Cherry Street, Waterbury, Conn.

DEALERS—Write for discounts on Aircraft-Comet-Continental-Construct-A-Plane-Capitol-Megow-Peerless-Cleveland kits and supplies. West Side Model Distributors, 9609 Lorain Ave., Cleveland, Ohio.

DEALERS write for information on sheet aluminum covered kits (The real Planes in Miniature). C. Z. Model Airplane Co., 1819 So. Spaulding, Chicago, Ill.

MODEL Builders: Send us your name and address for our monthly specials. Guaranteed savings. Capital City Model Shop, 71 E. Arch, St. Paul, Minn.

SAW Blade Specialists (band and circular) in balsa wood trade. Smooth cutting, least waste. M. Kaplan's Sons, 206a Centre St., N.Y.C.

MOTORS—(New and Used)—Trade-in allowance. Airplanes-Boats-Trains-Race Cars-Kits. Village Model Shop, 213-12 Jamaica Ave., Queens Village, N.Y.

FINISHED Props as low as 8c each. 1-2-3 blade types. Write for list. Westminster Craftsman, Westminster, Colo.

MISCELLANEOUS

EXCHANGE your duplicate stamps, match covers, etc. with collectors everywhere. List, swappers, Dime. (Mention hobby) Exchange, Box 2166, Denver, Colo.

[PRINTED IN U.S.A.]

Here's the Opening Gun of COMET'S Jubilee Year!

COMET MODEL BUILDERS' CONTESTS

1930
COMET JUBILEE YEAR
1940

As many as 50 PRIZES

The list of prizes in Comet Contests includes Comet's famous Gas Models, Comet Giant Flyers—and dozens of other Comet kits, as well as other prizes! You have a real chance to win!

FUN plus EXPERIENCE!

You'll have a world of fun building the model of your choice—and a lot of valuable experience! And won't you be proud to have your model selected as a prize-winner! It's worth-while working for!

NO COST TO ENTER!

There's no entry fee in a Comet Contest! Anyone can enter—and all you have to do is follow the simple rules to be eligible for one of the prizes! Don't miss out on the Comet Contest in your neighborhood—make sure you get in on it by checking with your dealer so that you will know when the contest begins!

Look for them at your COMET DEALERS

COMET starts off its Jubilee Year with a bang! All over the country Comet dealers, in co-operation with the Comet Model Airplane and Supply Company, are preparing to stage big, thrilling Model Building Contests—offering as many as 50 valuable prizes! Anyone can enter—everyone has a chance to win—and everybody who enters gets a lot of worthwhile experience and has a lot of fun! Watch for the big, colorful Comet Contest display in your dealer's window—then get your entry blank, which gives you the Rules, and go after the prize you want! These contests are scheduled to start soon—ask your dealer when he expects to put on a contest in your neighborhood!

A Surprise Every Month during COMET Jubilee Year

COMET is celebrating its tenth year of continuous growth and success in the manufacture of model airplane kits and supplies! We want YOU to celebrate with us—and that's why we've planned a surprise every month during 1940! You'll find plenty to cheer about as these surprises unroll before your eyes—new, sensational models—new ideas—new and better gas models designed by Carl Goldberg! Carl promises designs even more sensational than the Comet ships which took 5 out of 6 first places at the Nationals, and have led the field in events throughout the country! Watch the pages of your favorite model airplane magazine—keep an eye on your dealer's windows—for Comet's Jubilee Year Surprises!

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329 West 29th Street, CHICAGO, ILL. • 688 Broadway, NEW YORK

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MEGOW *Rubber-Powered* MODELS

are also eligible entries in contests featuring the big Megow cash and merchandise prizes to be offered all over the country during 1940!

Turned Nose Cowling on all round nose flying models, MOTOR HUM DEVICE on all flying models priced at 25c or more.

INSIST upon MEGOW Models at your Dealer's. If he can't supply you, write to us direct.

NOW . . . *a whole* FLEET *of* SOARING *Eagles*

$2.95 UP

POWERED CABIN CRUISER $3.95

By mail, post. 20c extra

Model of a fast, seaworthy cruiser. Balsa wood makes construction easy. Real mahogany superstructure. Spring motor, 5 minutes drive. Rudder controlled by steering wheel in cabin. Includes motor, fittings, detailed plan and all materials. Length 17 in.

Megow's

Dept. MA Howard & Oxford Sts., Philadelphia, Pa., or 217 N. Desplaines St., Chicago, Ill., or Great Western Merc. Co., 718 Mission St., San Francisco, California

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